

PART 2. EXISTING CONDITIONS ANALYSIS

The data collection efforts for developing the Existing Conditions Analysis consisted of a compilation of numerous references along with field visits in order to accurately describe the study area and identify the major features within the watershed. In addition to field reconnaissance, background information was gathered and used to develop a description of the existing conditions that will assist in the formulation of alternatives for this report. Maximum utilization of existing information was the basis for generating a comprehensive database of the existing conditions. In this section, existing facilities are identified and described, and an analysis of the area including: hydrology, natural and physical environment, geotechnical, land use, and socioeconomic characteristics is provided.

Previous reports for the Laveen/ South Phoenix area that have been referenced for this section and various sources of information were also collected to guide in the characterization of the study area. The following is a summary of the data inventory:

Hydrologic Models – The FCDMC provided the HEC-1 hydrologic computer models that were developed for the area during the design of the Laveen Area Conveyance Channel. The flood control facilities included in the model served as a basis of the significant facilities within the area. The model output was used to identify areas of flooding and to confirm the residents’ flooding concerns voiced during the first public meeting and during field visits.

Historic flooding – Sources of information for historic flooding included public input, photographs, and previous reports. During field visits, residents voiced their concerns regarding areas where historic flooding had occurred. Many residents were also able to express their concerns about areas that have been affected by floods at the first Laveen ADMP Public Meeting held on November 21, 2000 in an open house format. A summary of the public comments is available in the “Public Participation” section of this report. Archived photographs from the FCDMC and the residents, previous reports, information from MCDOT, and information from SRP were also used to identify areas of historic flooding.

Topographic maps, GIS base maps – HDR acquired existing topographic maps and GIS imagery to create a representative base map of the study area containing topography, planimetric features, utilities, and other existing facilities throughout the study area. GIS information compiled included files from SRP, City of Phoenix,

Arizona Department of Transportation, Arizona State Land Department, and FCDMC.

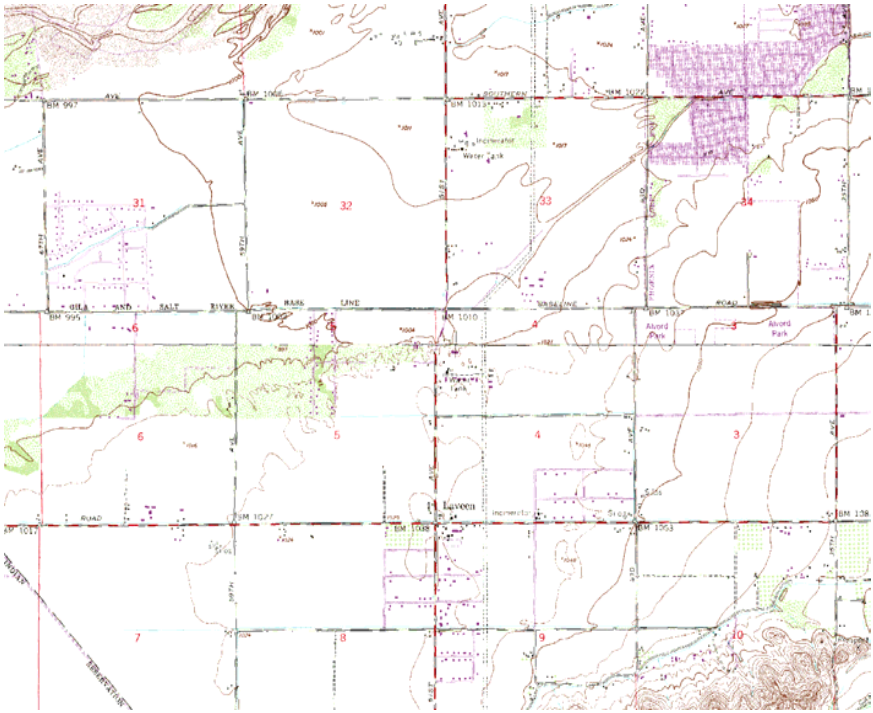


Figure 2-1: Topographic map of the Laveen ADMP study area

Floodplain Maps, CLOMRs, LOMRs – In order to develop effective flood protection measures for the Laveen ADMP, a primary data source consulted was the floodplain information developed by the Flood Emergency Management Agency (FEMA). In this case, the 100-year floodplain has been an issue of concern among many stakeholders and it was imperative that the most up-to-date information be considered for the ADMP. HDR developed a GIS database of the floodplain information and aerial imagery of the areas within the floodplain delineation. No Conditional Letters of Map Revision (CLOMRs) or Letters of Map Revision (LOMRs) have been developed for this area.

Land Use, Planning, and Zoning Information – Aerial photography, existing plans, and guidelines available from the City, County, and Laveen planning organizations were compiled for a study of land use, physical characteristics, trails, bikeways, zoning and planning. A list of the plans referenced is provided in the land use analysis portion of this section.

Census information – Socio-demographic and housing information was obtained from the US Census Bureau. Discussion of this data is

incorporated in the Census tracts portion of this section and includes employment, housing, income, ethnicity, and population trends.

Utilities, Infrastructure – The City of Phoenix has an extensive database of utilities, roads, and infrastructure for incorporated and unincorporated areas in Laveen. Utility companies including El Paso Natural Gas, Salt River Project (SRP), Arizona Public Service (APS), Cox Communications, and Qwest Communications were also contacted to obtain utility maps for the area. The information provided by the City will be used in the formulation of alternatives and development of flood control measures.

As-built drawings – As-built drawings were obtained for existing facilities including many of the SRP irrigation canals. This information provides a better understanding of the facilities in the area and will be used to further enhance the existing facility database. Construction drawings for the Laveen Area Conveyance Channel were also obtained for this same purpose.

Environmental and Cultural Resource Information – A literature search of existing environmental and cultural resource sites was performed and evaluated in this section. Preservation of sensitive biological and cultural areas will be a significant factor in evaluating the alternatives to be developed further in the study process. Thus, regulatory procedures and possible scenarios were evaluated during the development of these overviews. Because the previous Laveen Area Drainage Master Study evaluated the study area east of 43rd Avenue, the environmental and cultural overviews in this section are concentrated on a “focus study area” located west of 43rd Avenue. Existing information was obtained from the US Fish and Wildlife Service (USFWS) list of federally protected species, Arizona Game and Fish Department (AGFD), US Geological Survey (USGS), and a field investigation. No species-specific surveys were conducted as part of this evaluation.

Geotechnical Information – Research activities were performed and information was gathered from several sources including US Department of Agriculture, Soil Conservation Service (SCS), Arizona Department of Water Resources (ADWR), and USGS. Characterization of the focus area resulting from this analysis will aid in the development of future alternatives appropriate for the topography, geology, groundwater, and surface and near-surface soil and rock conditions.

HYDROLOGY

Watershed Description

The Laveen ADMP area is located in the southwestern portion of the metropolitan Phoenix area. The Salt River, 7th Avenue, South Mountain Park, and the Gila River Indian Reservation bound the 39-square mile study area in unincorporated Maricopa County and the City of Phoenix. Figure 2-3 shows the study boundary, existing and future improvements, and flooded areas.

The ADMP area is divided into three distinct drainage watersheds, the Maricopa Drain Watershed, the Hidden Valley Watershed, and the Southwest South Mountain Watershed. The largest watershed, the Maricopa Drain Watershed, is further divided into two parts based on the FCDMC decision to develop a separate drainage improvement plan for the upstream, more developed portion of the area. Detailed descriptions of each watershed as well as maps of each are included in this section.

Development of Hydrology

Laveen Area Drainage Master Study

The FCDMC began studying the Laveen area in 1989 with the development of the Laveen ADMS. The details of the study are found in “Laveen Area Master Drainage Study, Phase I, Hydrology Report, Existing Conditions.” This study identified the drainage features of the area and developed the hydrology used to predict the magnitude of flooding probable in the Laveen area. The study indicated the extent of flooding to allow for a floodplain delineation. The floodplain delineation revealed a very large floodplain at the former Maricopa Drain location. The hydraulics for this area are detailed in the report “Laveen Area Master Drainage Study, Phase I, Hydraulic Report.” These results were not well received by the residents of the area. The delineation and hydrologic modeling was completed according to FEMA criteria. Subsequent to the delineation, the FCDMC remodeled the storm water runoff taking into account all the physical features in the watershed. This remodeling reduced the floodplain width. Neither study has been adopted or sent for inclusion into the National Flood Insurance Program.

South Phoenix/Laveen Drainage Improvement Project

In 1995, the FCDMC initiated the South Phoenix/Laveen Drainage Improvement Project with HDR as the study contractor. This project is detailed in the report titled “Preliminary Design Report for the South Phoenix/Laveen Area.”

The goal of this project was to develop flood control features to provide flood protection for the residents of the South Phoenix/Laveen area between Central Avenue and 43rd Avenue, from South Mountain Park to the Salt River. The HEC-1 computer model developed in 1991 was used as the basis for the hydrology for the South Phoenix/Laveen ADMS. The 1991 existing conditions model was based on the existing condition 100-year, 24-hour storm event. This model used the Green and AMPT Loss Rate, Clark Unit Hydrograph, and Normal Depth and Modified Puls Routing procedures. The approach HDR used in revising the 1991 model was to use the model parameters as much as was practical in the development of the new sub-area parameters. Since the results of the 1991 study had been accepted by the FCDMC, drastic changes to the model and modeling results were deemed unacceptable.

The results of this drainage improvement project, which can be seen in Figure 2-3, included the recommendation of the following projects for flood mitigation:

- Storm Drain on 7th Avenue from South Mountain Park to Baseline Road
- Storm Drain on Baseline Road from 7th Avenue to 43rd Avenue (MCDOT beginning construction)
- Storm Drain on 43rd Avenue from Baseline Road to the Salt River (installed by FCDMC project)



Figure 2-2: 43rd Avenue storm drain being installed

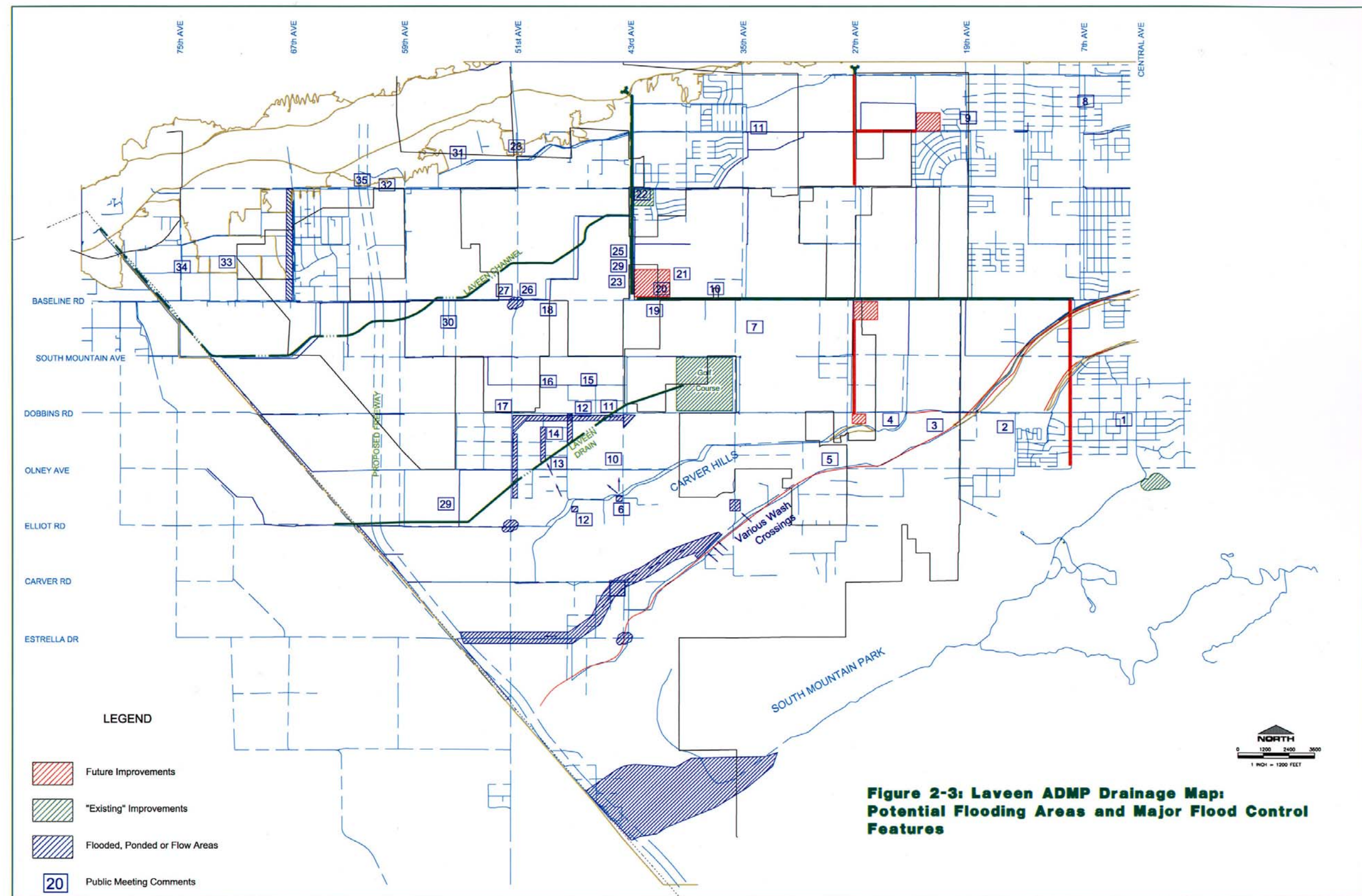
- Storm Drain on 27th Avenue from Dobbins Road to Baseline Road
- Storm Drain from Southern Avenue to the Salt River
- Detention Basin at 27th Avenue and Dobbins Road
- Detention Basin at 27th Avenue and Baseline Road
- Detention Basin near Lindo Park (23rd Avenue & Roeser)
- Detention Basin at Dobbins Road and 35th Avenue (contained within the Aguila Golf Course)
- Detention Basin at 43rd Avenue and Southern Avenue (currently under FCDMC design)
- Detention Basin at 43rd Avenue and Baseline Road (added after project)

Laveen Area Drainage Master Plan

The original hydrology models will be used as the existing conditions models for the Laveen ADMP. Since the conclusion of the South Phoenix/Laveen Drainage Improvement Project, the FCDMC has made modifications to the Maricopa Drain Watershed hydrology model to update it for flood control features constructed in the watershed. Most of these features were identified in the previous drainage improvement project. Several of these features are not yet “existing” but it is anticipated that they will be completed when this ADMP is concluded. The ADMP will be developed as if they were complete.

Existing Condition Hydrology Models for this Study

The ADMP area is divided into three distinct drainage watersheds with unique HEC-1 hydrologic models. The three watersheds are the Maricopa Drain Watershed (LB2D.DAT), the Hidden Valley Watershed (HDNVLLY.DAT), and the Southwest South Mountain Watershed (SWSM24.DAT). The HEC-1 input and portions of the output are in Appendix A.



Maricopa Drain Watershed

The Maricopa Drain Watershed, originally called the Champion Drain Watershed, remains much the same as in the original ADMS. More than 80% of the ADMP area is included in the Maricopa Drain watershed. Totalling nearly 32 square miles, the area includes sub-basins in the desert mountain area of South Mountain, large agricultural areas, rural residential areas (including small ranches and family farms), and more urbanized higher density developments. Drainage patterns show that storm water runoff flow will travel from the southeast to the northwest, or from South Mountain Park to the Salt River. The Maricopa Drain intercepts most of the runoff in the area.

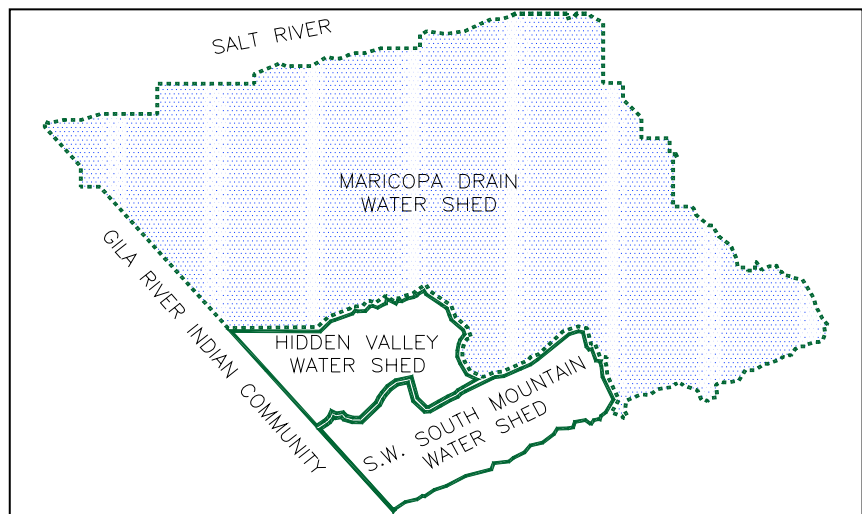


Figure 2-4: Maricopa Drain Watershed

Several changes have been made to the model over the years. For the purposes of this ADMP, five sub-basins formerly in the Hidden Valley watershed model are now included in the Maricopa Drain Watershed because a portion of the flow from this area contributes to the Laveen Area Conveyance Channel. The model has been modified by the inclusion of some features of the South Phoenix/Laveen Drainage Improvement Project. These basins are included because they contribute runoff to the Maricopa Drain. The model includes features of the plan that have already been constructed or are in the process of design and construction as well as minor modifications that have developed during the last 10 years. These features, many of which were identified in the drainage improvement project, include the storm water retention features in Aguila Golf Course at 27th Avenue and Dobbins, the Baseline Road Storm Drain from 7th Avenue to 43rd Avenue, the 43rd Avenue storm drain outfall to the Salt River, the storm water detention basin at 43rd Avenue and Southern,

and the new Laveen Area Conveyance Channel from 43rd Avenue to the Salt River. The FCDMC is currently preparing documentation for the changes made in the interim since the drainage improvement project. Changes were incorporated into the model to more closely resemble the actual behavior of storm water flows (i.e. – routing reaches were made to flow at a more reasonable velocity, etc.).

Appendix B shows the various sub-basins, flow patterns and the flow rates at various locations within the Maricopa Drain Watershed. These flow rates will be considered the existing conditions for the phases that follow in developing this ADMP.

Hidden Valley Watershed



Figure 2-5: Carver Hills

The Hidden Valley watershed is located on the west end of the study area between the Gila River Indian Reservation and South Mountain Park. Hidden Valley is nestled between South Mountain and Carver Mountain and has natural ground slopes to the west. Runoff is conveyed to the west and eventually onto the Reservation.

Totalling nearly three square miles, the area includes sub-basins in the desert mountain areas of South Mountain and Carver Mountain, large agricultural areas, rural residential areas (including small ranches and family farms), and almost no higher density developments.

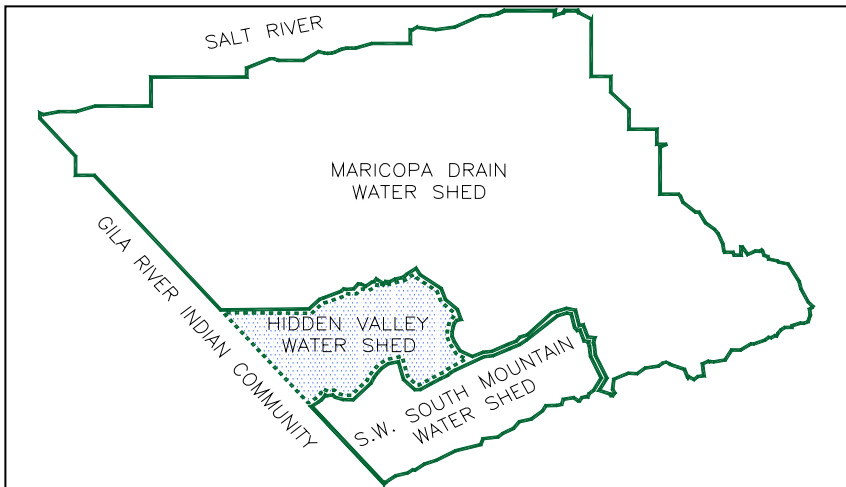


Figure 2-6: Hidden Valley Watershed

Southwest South Mountain Watershed

At the southwest part of the ADMP area is the Southwest South Mountain Watershed. This watershed is uniquely different from the other watersheds. It is nearly 100% desert mountain and hill slope runoff. The drainage area is slightly more than four square miles in area. The area extends to the east and is adjacent to the uppermost portions of the Maricopa Drain Watershed. The flow is generally to the west following San Juan Road in Phoenix’s South Mountain Park. The westernmost edge is developed, mostly with large lots and desert/natural landscape. Runoff from area sub-basins does not combine, but is instead conveyed out of the ADMP area across the Reservation boundary through sheet flow or in small channels. The area appears to be alluvial and has the appearance of a fan in some locations.

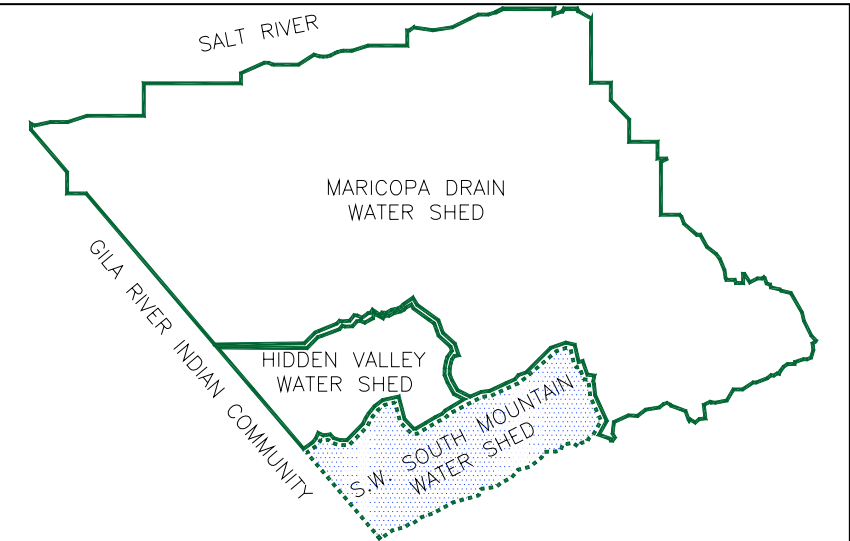


Figure 2-7: Southwest South Mountain Watershed

Existing Flooded Areas

In addition to the flooding of the Maricopa Drain alignment predicted by the original Laveen ADMS, there are other locations within the Laveen ADMP area that are known to have significant flooding problems, and still other locations where flooding has the potential to do harm. A search of public documents showing the location of historic flooding locations did not produce significant results. Possible explanations are that the area is largely agricultural in nature and the flooding that does occur is in locations where homes and personal property are not affected.

The Maricopa County Department of Transportation (MCDOT) did produce some documentation of street floodings in the Laveen area. The information from the Records Administration was added to the Laveen ADMP drainage map. A copy of the Records obtained can be seen in Appendix C.

At the Laveen ADMP first public meeting several residents noted that there were past flooding problems that concerned them in the Laveen area. One resident provided videotapes of three separate events that flooded his house. Another resident provided photos of a flooding event in their neighborhood.

Other locations of potential flooding were identified using the results of the hydrologic models developed for the ADMS. Areas of large, concentrated flow or large values of sheet flow predict that flooding is probable for the 100-year event.

Field investigations confirmed existing areas that may also be of concern. Among these areas, the Laveen Elementary School, located on 51st Avenue and Dobbins Road, was pointed out repeatedly by residents and school officials. During a storm event in 1999, the school experienced damage to various classrooms. Several causes can be attributed to the flooding in the school. Figure 2-8 shows an irrigation ditch between the Laveen Elementary School and a sub-division east of the school. The ditch has created a dam where stormwater flowing from the east towards 51st Avenue collects.



Figure 2-8: Irrigation Ditch between Laveen Elementary School and a sub-division located east

Residents reported that they had to breach the canal in the past to relieve the ponded stormwater around homes in the area. This, however allows the water to flow onto the school or private property to the west.

Another cause that may significantly contribute to the flooding at the Laveen Elementary School follows a line of flooding patterns along Dobbins Road. Shown on the left foreground of Figure 2-9 is an



Figure 2-9: Elevated Headwall of an Irrigation Ditch located at 43rd Avenue and Dobbins Road

elevated irrigation ditch located along the north side of Dobbins Road, at 43rd Avenue, that causes flows to be contained on the south side of the road flowing westerly. Further along Dobbins Road, near 47th Avenue, the elevation of the road and the irrigation ditch on the north side help to form a swale along the south side of the road causing storm runoff to be directed west. This can be observed in Figure 2-10. As a result, storm water flows to the west into a subdivision beyond 47th Avenue where residents have complained of flooding recently. Following this same pattern, storm water continues to flow west towards the Laveen Elementary School.



Figure 2-10: Looking west along the south side of Dobbins Road near 47th Avenue

Figure 2-11 shows the elevated road, the elevated canal, and the school in the background.



Figure 2-11: Looking west on the south side of Dobbins Road showing the elevation of the road, the elevated canal, and Laveen Elementary School

During the same storm event in July of 1999, the intersection of Steinway Drive just south of Dobbins Road and 51st Avenue also experienced flooding (see Figure 2-12).



Figure 2-12: Intersection of 51st Avenue and Dobbins after storm event in July of 1999

Flooding occurs along 51st Avenue south of Dobbins Road and within the sub-division to the east of 51st Avenue. As seen in Figures 2-13



Figure 2-13: Flooded yard located in the southeast quadrant of 51st Avenue and Dobbins Road after July 1999 storm event

and 2-14, the area southeast of Dobbins Road and 51st Avenue became flooded during this event and water flowed into yards and homes.



Figure 2-14: Flooded home located in the southeast quadrant of 51st Avenue and Dobbins Road after July 1999 storm event

Additional areas of potential flooding were also observed. One such area is shown in Figure 2-15.



Figure 2-15: Canal south of Dobbins along 49th Avenue alignment

A canal is located approximately on the 49th Avenue alignment, just south of Dobbins Road. It continues south for several hundred feet and blocks the stormwater in that area.

Figure 2-16 shows an area located at 67th Avenue between Baseline Road and Southern Avenue. This area is depressed from adjacent lands creating a potential for flooding.



Figure 2-16: 67th Avenue between Baseline Road and Southern Avenue

Along Carver Road, at the Western Canal, there are several locations where overchutes are provided for storm water conveyance across the canal. These locations cause flooding and maintenance problems along the roadway. In addition, runoff from Carver Hills and parts of South Mountain flow to an un-named wash just north of Carver Road. This runoff eventually reaches the wash and is conveyed west to the Carver Road crossing as seen in Figure 2-17. Consequently, homes downstream of the Carver Road Wash crossing have been bermed to prevent flooding. There is no apparent wash on the south side of Carver Road.



Figure 2-17: Wash approaching Carver Road crossing



Figure 2-18: 47th Avenue and Estrella Road

Additional flooding problems caused by this wash can be observed at the intersection of Estrella Road and 47th Avenue (see Figure 2-18).

Storm water flows from the wash and from other areas in Hidden Valley towards Estrella Road at 47th Avenue. From this location, flows generally follow Estrella Road to the west towards the Gila River Indian Reservation.

East of 51st Avenue, also on Estrella Road, there is a swale on the north side of the road and a large dirt ditch on the south side. On the west side of 51st Avenue, the ditch switches north of Estrella Road and continues to the Reservation. There is evidence in Figure 2-19 that the capacity of this culvert crossing at 51st Avenue is sometimes exceeded and flows escape the canal to the north side of the road. This adds to the ponding that occurs on the east side of 51st Avenue.



Figure 2-19: Estrella Road east of 51st Avenue

A major feature observed during field investigations is located within the Southwest South Mountain watershed. A large portion of the watershed is made up of an alluvial fan from the South Mountains with some dispersed development (see Figure 2-20). The FCDMC is monitoring the fan as a study project and has several structures in place within the park area to monitor changes in the fan.



Figure 2-20: Alluvial fan from the South Mountains

Development in the area attempts to work around the existing drainage features and washes as observed in Figure 2-21.



Figure 2-21: Development surrounding flood control features within the Southwest South Mountain watershed

Figure 2-3 shows the various watersheds, flood control features, drainage paths, and known or potential flooding areas. Also included (denoted by the numbers) are the comments made by residents of the area who attended the first Laveen ADMP public meeting.

Hydrology Summary

In 1989, a District Area Drainage Master Study was performed that identified several locations where flooding was severe or problematic. The results from that report were developed into a drainage improvement project in the eastern half of the Laveen study area. Those projects provided drainage solutions where floodwaters could be collected, controlled, and conveyed offsite. Projects included basins, storm drains, and a pump station in the area east of 43rd Avenue. This current ADMP hydrologic study effort presents the results of updating flood control hydrology to complete the plan in the west half of the study area. The hydrologic models have been updated to include changes to the present date in the watershed.

The west half of the study area includes three separate watersheds. They are: the Maricopa Drain Watershed (this includes the South Phoenix/Laveen DIP section and the Laveen Area Conveyance Channel section), the Hidden Valley Watershed, and the Southwest South Mountain Watershed. Information has been collected from various sources and mapped to determine the severity and extent of the flooding areas within the project boundary. This information has been documented, and correlates well with the results of the hydrologic models.

PUBLIC PARTICIPATION

Community members also contributed to the Data Collection phase of this ADMP. As the field visits were taking place, residents from the area spoke to many of the ADMP engineers, planners, and scientists. Each interaction contributed to the understanding of the Laveen area. Residents provided photographs and videos and described their experiences while living in the area. Most of this information corroborated the findings from the hydrologic models and locations where flooding occurs.

The first Laveen ADMP Open House meeting was held on November 21, 2000 at the Laveen Elementary School. Attendance consisted of community members, public officers, representatives from the agencies involved with the Laveen Improvement Project (FCDMC and City of Phoenix), and consultants working on the ADMP.

The meeting provided a setting where members of the community could learn more about the ADMP and contribute to the Data Collection effort. It was an opportunity for many to voice their specific concerns and address their comments. This was facilitated by the use of interactive maps where attendees could write and comment on flooding areas within a specific location. A summary map is shown in Figure 2-3. The number denotes comments addressed at the meeting.

Table 1: Summary of Public Comments presented at the Laveen ADMP Open House (numbers correspond to Figure 2-3).

Number	Comment
1.	Dobbins floods from Central
2.	Animal shelter (15 acres)
3.	People have driven off road into canal
4.	Road floods (very low area)
5.	Irrigation canal
6.	Irrigation canal
7.	30 Acre housing development Perforated underground drain (can't build on top of it)
8.	Bridge
9.	Bridge
10.	Open ditches dangerous
11.	Bridge
12.	Water breaks out here from wash
13.	Flooded homes in 1989
14.	47 th Avenue flood problems – ditch dead ends at La Mirada Road
15.	Irrigation ditch overflows to south
16.	Dobbins flooded last year {1999} 8" – 16" from 47 th to 51 st
17.	School flooded last year {1999} reference Frank Grimes
18.	(Duplicate) SRP Cistern drains (this one just put in)
19.	(Don't know where this one is)
20.	(Duplicate) Homes along Dobbins flooded up to door last year {1999}
21.	Water 2' deep in pasture (behind homes) {south of Dobbins, east of 47 th }
22.	Grade drops about 30"
23.	15 Ac. Basin @ 43 rd and Baseline NEC
24.	Area floods when it rains
25.	Homes going in here now
26.	Sewer lift station
27.	River used to run out 43 rd and Baseline
28.	Possible cave in/sinkhole NWC 43 rd and Baseline
29.	Geographical fault
30.	River used to run across 51 st Ave. and Baseline
31.	Future commercial
32.	Only bridge for people to west
33.	SRP perforated underground drain
34.	Standing water area
35.	Elliot's River Walk
36.	202 @ 61 st Ave (currently)
37.	Water about 5 to 6' deep across this area
38.	Sewage lift station
39.	No? Bridge.

Table 1 summarizes these comments and includes the corresponding number. Figure 2-3 also represents areas of localized flooding as demonstrated by hydrologic models. As can be observed, many areas of local flooding coincide with public comments.

The Laveen ADMP website (www.laveenadmp.com) has been developed to provide the public information on the study including schedules, locations, maps, reports, summaries, and contacts. This website is continuously updated providing the latest developments on the ADMP.

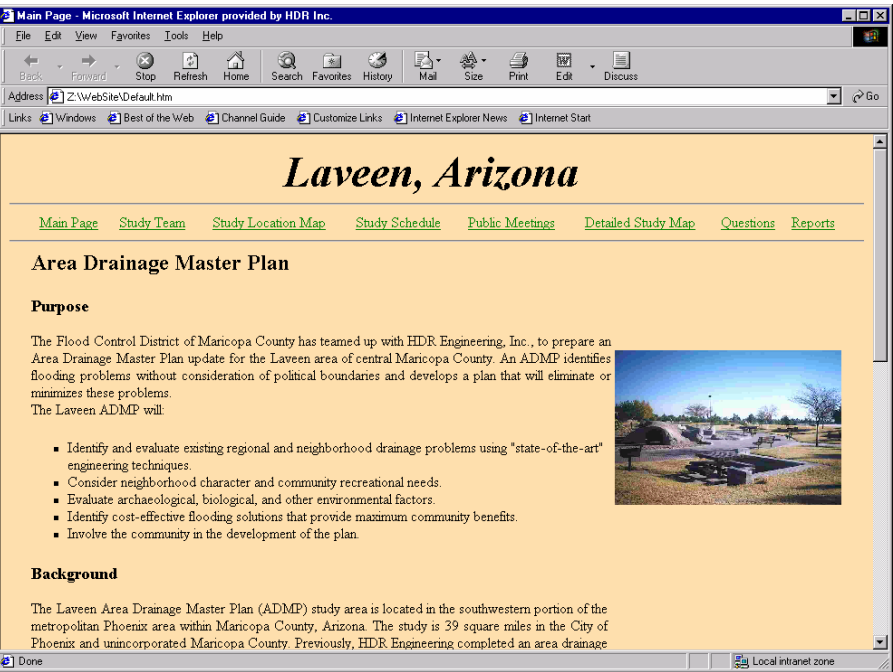


Figure 2-22: Laveen ADMP Website

Public Participation Summary

Public involvement is an integral part of this study and was a primary source of information for the existing conditions analysis. Residents were approached during field visits and they were able to voice their concerns about previously flooded areas and potentially flooded areas. The Laveen ADMP first public meeting was held on November 21, 2000 in an open house format. Residents pointed out problem areas and previously flooded areas on a map. These are of potential flooding were verified with hydrologic model output and they seem to converge. They can be seen in Figure 2-3.

Additional Public Meetings were held throughout the process and are discussed in the corresponding sections of the report. The second Public Open House was held on February 20, 2001 as part of the Alternatives Formulation process of the ADMP. This meeting was organized in a series of stations showing each alternative.

The third public Open House was conducted on June 5 2001. This meeting was part of the Alternatives Analysis Portion of the ADMP. It consisted of two segments: a 15-minute informational session providing an overview of the ADMP process, and several stations showing the conceptual engineering and landscape plans for each of the alternatives in this portion of the study.

The final Public Meeting was held on October 1, 2001 and was part of the Recommended Plan. This meeting was a formal presentation that provided an overview of the complete process and of the recommended plan. A question and answer session followed the presentation.

Project information is continuously updated and posted on the official study website, www.laveenadmp.com.

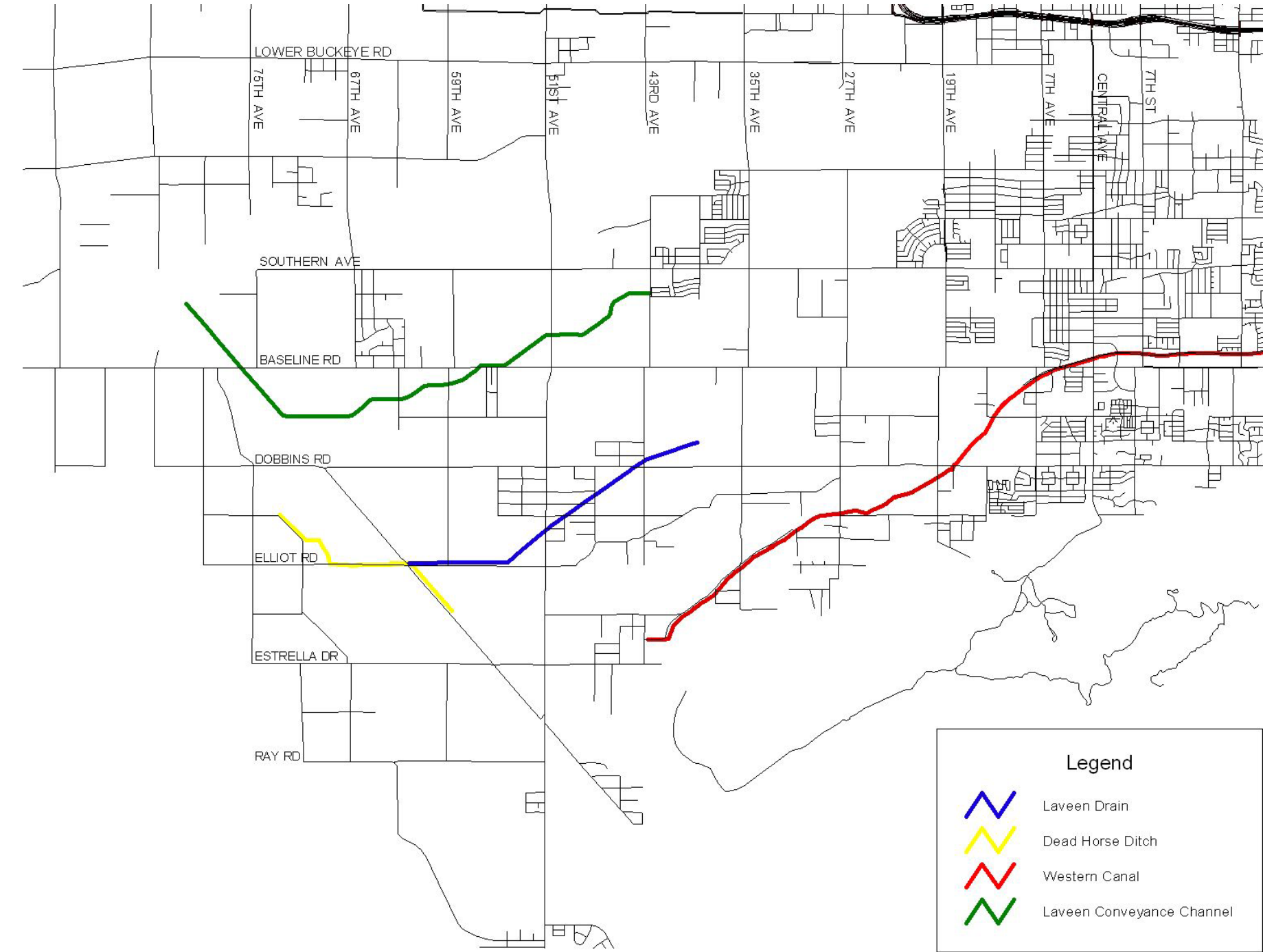
EXISTING FACILITIES

Located within the Laveen ADMP study area are several major canals that may contribute in some way to surface drainage. Figure 2-23 shows the location of these facilities.

Laveen Area Conveyance Channel

The Laveen Conveyance Channel Project is a result of the joint efforts between FCDMC, City of Phoenix, and individual owners to provide flood control protection and relief to the Laveen area. It is expected to be constructed in 2001/2002/2003. The purpose of the channel was to provide flood protection for the area bounded by the Salt River on the north, the Gila River Indian Reservation on the west, South Mountain Park on the south, and 43rd Avenue on the east.

The channel begins on the upstream end at 43rd Avenue one-half mile south of Southern Avenue (Vineyard Road) and flows southwesterly to 59th Avenue where it crosses Baseline Road. The channel continues southwesterly to 67th Avenue where it meets South Mountain Avenue, one-half mile south of Baseline Road and continues due west parallel to South Mountain Avenue to the powerline alignment one-quarter mile west of 75th Avenue. The conveyance channel then parallels the powerline alignment to the



northwest to the Salt River, which is the outfall for the storm flows. The length of the channel is 30,911 feet or 5.85 miles. The channel cross-sections vary to a minor degree throughout the reaches. The average width of the channel corridor is 200 feet (see Figure 2-24), with a depth varying from 5½ feet to 8 feet, and 5:1 side slopes. Differing sections with retaining walls are present where adjustments have been made to accommodate the powerline corridor.

Figure 2-23: Major Existing facilities within the Laveen ADMP study area

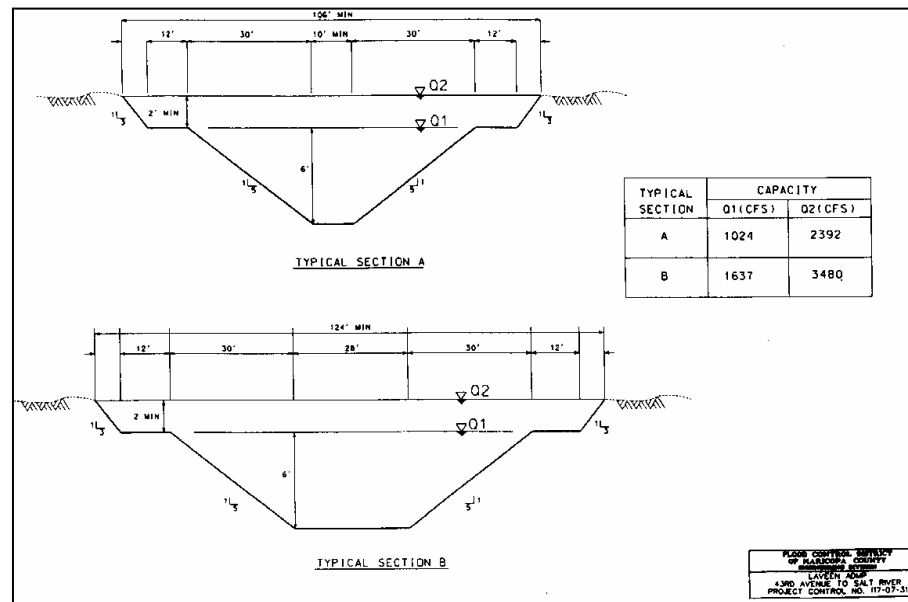


Figure 2-24: Laveen Area Conveyance Channel Cross-section

The capacity of the channel ranges from a maximum of 1,900 cfs at the upstream end to a final capacity of 34,000 cfs at the downstream end at the outfall. Within the channel there is a low-flow channel that is maintained to deliver irrigation water to the Gila River Indian Reservation. The low-flow channel was designed to allow a nominal flow of 10 cfs to the Gila River Indian Reservation with a peak capacity of 20 cfs. The source of water for these deliveries is a pump currently being used by SRP for deliveries to the Gila River Indian Reservation.

Agricultural flows from irrigation tailwater are also being collected from the surrounding flood irrigation farm fields and will continue to be conveyed to the channel until the area is fully developed.

The Laveen Area Conveyance Channel takes advantage of the 200-foot corridor to provide for multi-use amenities and recreational facilities while enhancing the landscape and aesthetic character of the channel (see Figure 2-25).

Western Canal

The Western Canal is a 13.6-mile structure located in the southeastern portion of the ADMP study boundary along the South Mountain foothills. The canal went into operation in 1913. It is a trapezoidal concrete channel managed and operated by SRP. The Western canal is the primary outfall for the southern area between Carver Hills and South Mountain Park.

The canal runs southwesterly near 7th Avenue and Baseline Road towards 43rd Avenue and Estrella Drive. The structure accepts or impedes some stormwater flows from the surrounding area creating some impoundment of water behind it.

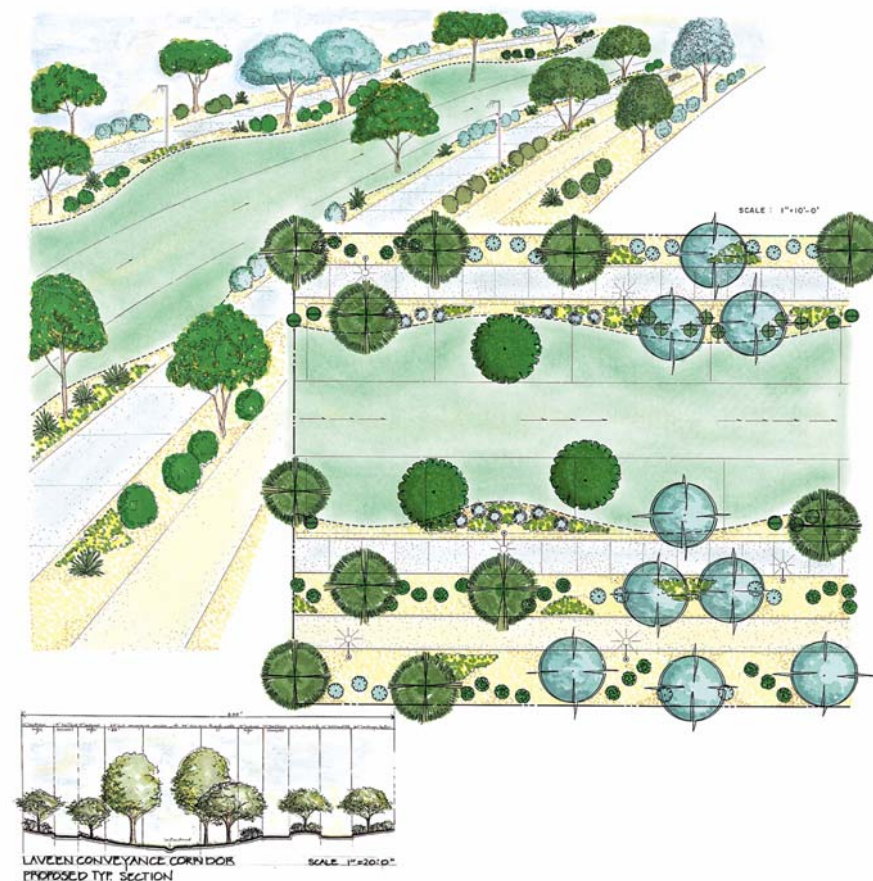


Figure 2-25: Laveen Area Conveyance Channel Multi-use Facilities



Figure 2-26: Western Canal

The actual irrigation laterals that lie within the focus area are laterals 12.8 and 14.0 in the SRP system. These laterals deliver water from the Western Canal to the areas surrounding Carver Mountain, including the area called “Telegraph Pass”. Both are trapezoidal concrete ditches typically elevated for delivery of water to the surrounding land creating a barrier to the storm flows. Numerous culverts have been installed to bypass this storm water and appear to have been in service for decades.

The SRP lateral system will affect local flow patterns if the canals are tiled when roadways are constructed, as is typically done. For the purpose of this ADMP the existing open channel lateral is considered in-place.

Dead Horse Ditch

Dead Horse Ditch is an earthen channel that parallels the Gila River Indian Reservation boundary/power-line corridor west of Carver Hills. It runs northwesterly from 51st Avenue one-half mile south of Estrella Drive up to Elliot Road where it turns and proceeds westerly onto the Gila River Indian Reservation.

Laveen Drain

The Laveen Drain varies in diameter from 10 inches to 18 inches. Beginning near Chavez Park at 43rd Avenue and Dobbins Road, it proceeds southwesterly to 55th Avenue just north of Elliot Road and turns westerly, ultimately outflowing into Dead Horse Ditch.

The Salt River is the ultimate outfall for the Laveen study area, as well as a major portion of the Salt River Valley. The Laveen Area Conveyance Channel outfalls into the Salt River at approximately the 81st Avenue alignment. The 3400 cfs that flows from the channel to the river is minor compared to the 100-year capacity of 164,000 cfs, as reported by the US Army Corps of Engineers. Reported watershed flows have since been reduced with the expansion of Roosevelt Dam. The flows in the river are the combination of other city outfalls and the areas that drain to the Salt and Verde Rivers downstream of Granite Reef Dam. Flooding problems caused by river backflows are not analyzed in this study, but public feedback within the whole study area has been incorporated into the data collection.

Figure 2-28: Laveen ADMP floodplain map

Existing Facilities Summary

The SRP irrigation canals have served as stormwater conveyance facilities throughout the Laveen ADMP study area, although this was never intended in their original design. Among the major irrigation facilities, the Western Canal, Dead Horse Ditch, and the Laveen Drain can be pointed out as major features that influence overall storm drainage. The Western Canal, located in the southern portion of the study area, has two major laterals that provide irrigation delivery to neighboring agricultural fields. Dead Horse Ditch is an open earthen channel that collects agricultural drain water and storm flows along the western boundary of the study area and conveys them westward onto the Gila River Indian Reservation. The Laveen Drain is a subsurface pipeline intended to drain perched water from farmlands located around 43rd Avenue near Chavez Park to Dead Horse Ditch.

Typically, as development occurs in SRP service areas, delivery ditches and minor laterals will be rebuilt as closed conduits, rather than remain as open channels. Therefore, their significance in directing local storm drainage will be removed. The major open channel facilities, in this case the Western Canal and Dead Horse Ditch, will likely remain as permanent open-channel facilities. It is possible, however, that they may be resized or reconfigured to compliment development needs.

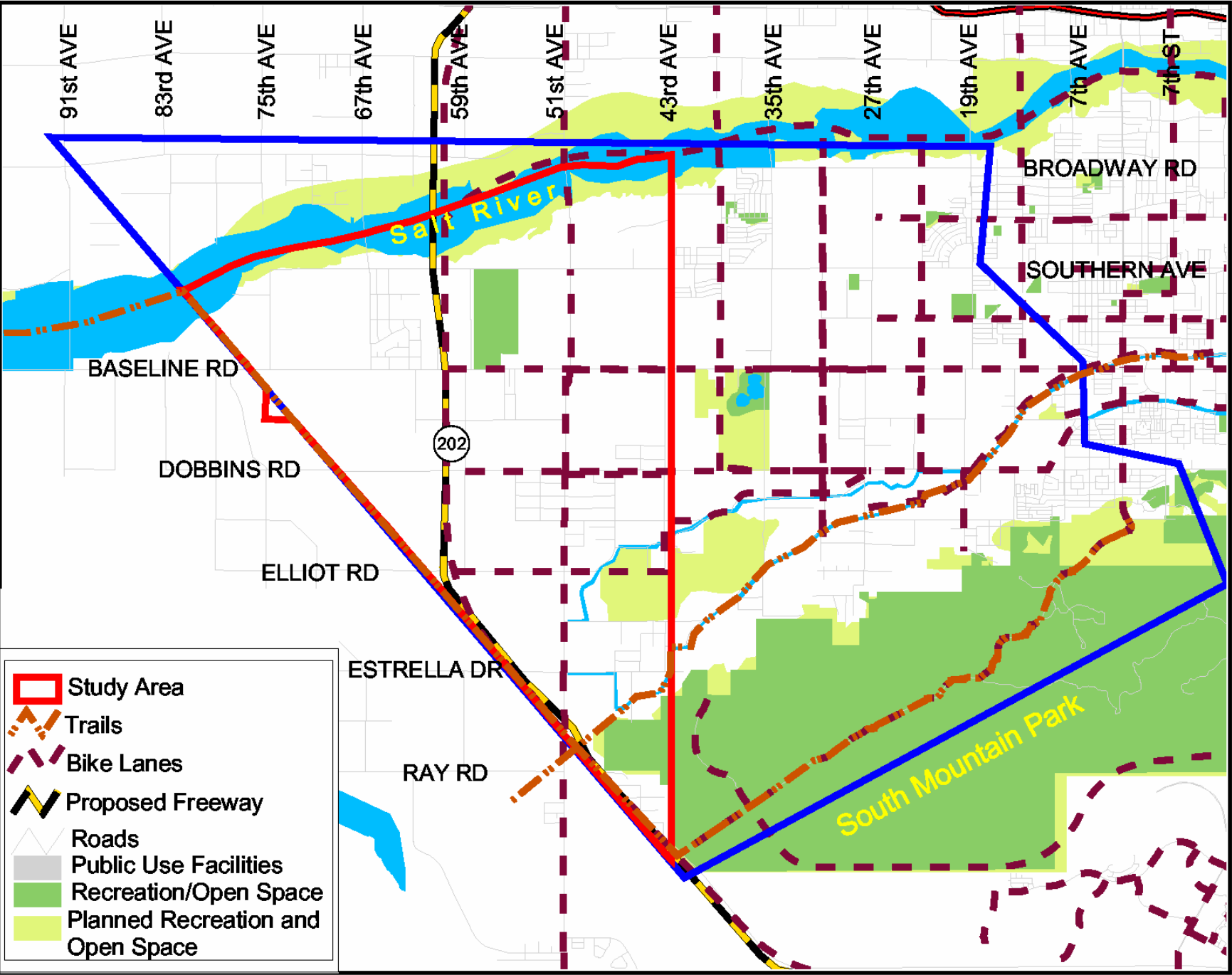


Figure 2-29: Laveen ADMP Modal Map

The Laveen area roadway and vehicular system is similar to other agricultural areas surrounding the Salt River. The major mile and half -mile roads as well as a few isolated subdivision roads are paved. However, in the southwestern portion of the focus area most roads are compacted dirt and gravel.

The main streets providing access to Laveen are 19th Avenue and 51st Avenue, referred to as the gateways to Laveen in the Maricopa County Land Use Plan. 19th Avenue connects Laveen to downtown Phoenix and 51st Avenue connects Pecos Road to I-10. The Laveen area is transitioning to a time where greater vehicular traffic is being observed and this growing trend has been forecasted to continue as the area develops.



Figure 2-30: 59th Avenue and Dobbins Road

MCDOT is currently working on various road projects in the area, mainly on 51st Avenue and Baseline Road. Currently, 51st Avenue is the only street providing access south of South Mountain. It is heavily transited by trucks, which make up 20% of the traffic on 51st Avenue¹. In addition, this road serves as an alternate route for many drivers who want to avoid the Phoenix Metropolitan area. Also, the Gila River Indian Community casino has generated a significant increase in traffic in the past years. In order to manage these

¹ Maricopa County Department of Transportation 51st/59th Avenue Corridor Truck Bypass Contingency Study.

increasing demands, the MCDOT has greatly improved this roadway along with Baseline Road.

Two roadway projects on 51st Avenue were completed by MCDOT and the City of Phoenix in recent years. The stretch from Baseline Road to Elliot Road was constructed and improved from the existing two lane to a four-lane roadway with raised median. Intersection improvements and other safety modifications to handle the increased traffic are also underway. The second project included the stretch from one-quarter mile south of Baseline Road to the Salt River Bridge. The 51st Avenue Bridge was also replaced due to scour damage from previous flooding events. The new bridge was built alongside the previous bridge and is a four-lane bridge with a raised median. The construction of the new bridge further demonstrates that the 51st Avenue corridor will continue to be the major corridor for traffic within the focus area.



Figure 2-31: 51st Avenue and Dobbins

Baseline Road, between 7th Avenue and 51st Avenue was also widened from a two-lane road to five-lanes, with a left-turn lane in 2000/2001. Traffic signals will be installed at the intersection of Baseline and 51st Avenue. The FCDMC is also participating in this project in the installation of a new storm drain system identified in the previous Laveen Area Drainage Master Study. In fact, most of the improvement projects also included the installation of storm drain facilities in conjunction with the roadwork. Work between MCDOT, FCDMC, and City of Phoenix make possible the success of this joint effort.



Figure 2-32: 51st Avenue and Baseline Road

Loop 202 South Mountain Transportation Corridor

The future Loop 202 South Mountain Transportation Corridor corridor is planned and will be a significant feature in the Laveen ADMP Study area. The latest Arizona Department of Transportation (ADOT) report,

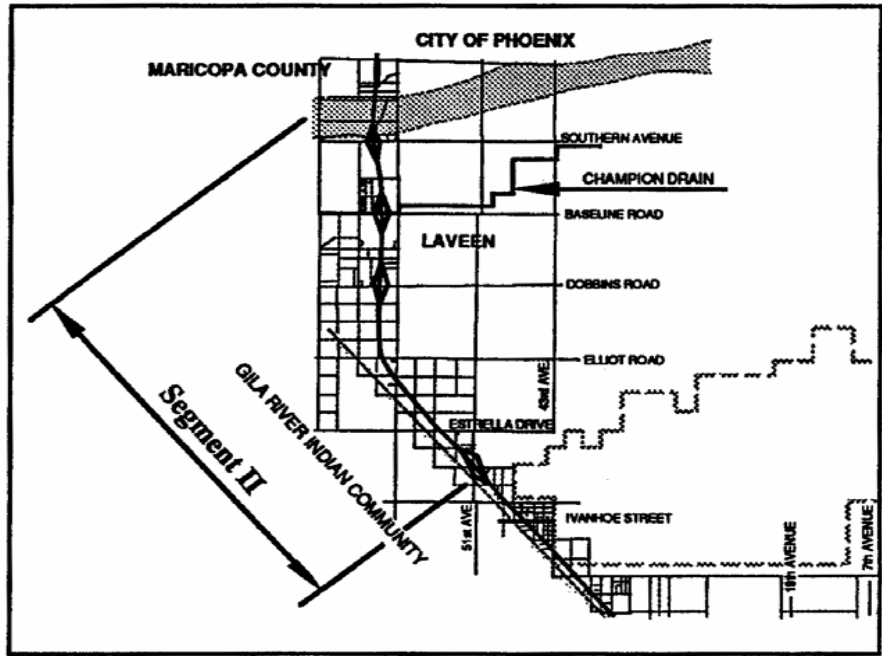


Figure 2-33: South Mountain Transportation Corridor Alignment

prepared by HDR in February 1993, identifies the corridor as being west of 59th Avenue from the Salt River south towards Elliot Road. The transportation corridor heads southeast running parallel to the Gila River Indian Reservation boundary.

Planned drainage improvements incorporated in this project include a reinforced concrete channel that collects stormwater drainage from the transportation corridor. According to the drainage study for the Loop 202, the section from I-10 Papago to the Salt River, including a bridge at the river crossing, is elevated on embankment and will intercept overflows from the east and northeast. The transportation corridor is planned to contain a lined channel along the east of its alignment to serve as an outfall for on-site discharge as well as a conveyance for off-site runoff. Typical cross-sections of the channel are shown in Figure 2-34. The bridge will be analyzed and restudied before design.

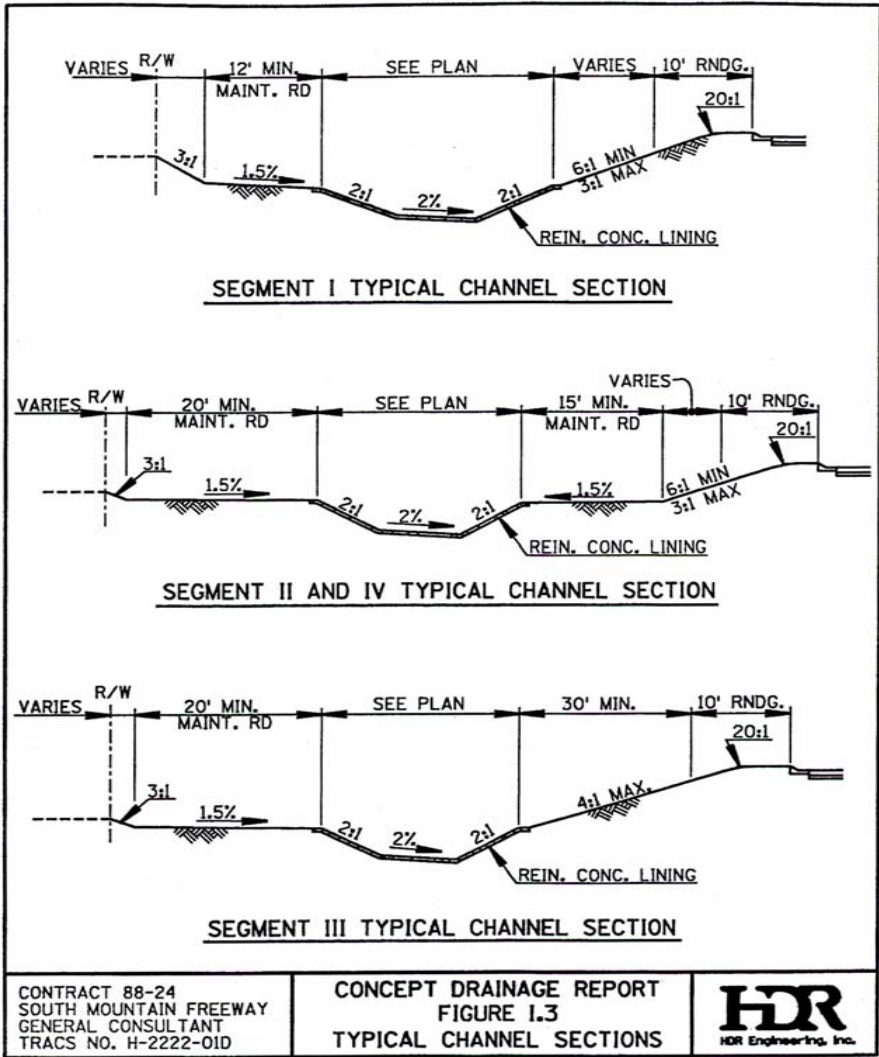


Figure 2-34: Typical lined-channel cross-sections

Another section of the transportation corridor running from the Salt River to 51st Avenue will be similar in nature with the exception of a depressed portion at Dobbins Road. This section of the transportation corridor will also contain a lined channel to collect runoff from overflowing irrigation ditches and storm drain features along the alignment.

The report documents three options where the proposed ADOT drainage study meets the Laveen Area Conveyance Channel alignment. If constructed, flows south of the study area would be collected within the lined channel and conveyed north to the outfall at the Salt River.

Modal Summary

A mile-road grid pattern dominates the roadway system, within the study area with 51st Avenue and Baseline Road serving as the two primary roadways. Both roadways have been (or currently are) being improved to urban arterial standards in two to four mile reaches. To date no significant drainage facilities have been included in the design of these roadways. 51st Avenue has a high volume of traffic consisting of through traffic, casino generated traffic, and local transit. Twenty percent of the traffic on this roadway is heavy truck traffic. The Salt River Bridge at 51st Avenue is one of the few crossings of the river and also the only link north to I-10. The proposed South Mountain transportation corridor alignment has been identified at approximately 63rd Avenue from the Salt River south towards Elliot Road and southwest paralleling the Gila River Indian Reservation boundary. The preliminary study for the transportation corridor has a drainage channel that would collect flows from the east and conveys those flows north to the Salt River.

The development of the South Mountain Transportation corridor by ADOT, and improvements to the mile-road system by MCDOT and the city of Phoenix, particularly to 51st Avenue and Baseline Road, are features that will have a significant impact upon local storm drainage and will play a large part in determining the size, type, location and construction timing of drainage facilities planned for in the ADMP.

GENERAL PLAN LAND USE

Three plans address land use within the Study area; the Southwest Growth Study, the City of Phoenix General Plan 1985-2000, and the Maricopa County Eye to the Future 2020.

The City of Phoenix adopted the Southwest Growth Study/Laveen in January 1998. The Southwest Growth Study amended the adopted City of Phoenix General Plan and was developed as a result of a 5.6-square mile annexation and heightened interest in constructing the Southwest Loop. The Southwest Growth Study covers all land bounded by 27th Avenue, South Mountain Park, the Gila River Indian Community and the Salt River. It includes unincorporated land in Maricopa County. Maricopa County, through its comprehensive planning program, will follow City plans for unincorporated properties with the City of Phoenix Metropolitan Planning area if the City has involved County residents in the Planning effort. (Page 2, City Council Approval for Southwest Growth Study/Laveen).

Areas outside the Laveen area are included in the City of Phoenix General Plan and have no specific area plans associated with them. Figure 2-35 depicts planned land use for the study area.

The largest land areas are reserved for large-lot residential and open space. A large portion of the area's open space consists of the City of Phoenix owned South Mountain Park. Other areas, south of Baseline Road and east of 27th Avenue and around the traditional Laveen core at 51st Avenue and Dobbins Road are existing low-density residential areas and are planned to remain as such.

Newly developing areas, such as the areas west of 27th avenue north of Dobbins Road, around the Southwest Loop at 61st avenue and around Alvord Park are largely undeveloped and planned for higher density residential and higher intensity commercial uses. The approximate acres and percent of the study area by land use are shown in Table 2.

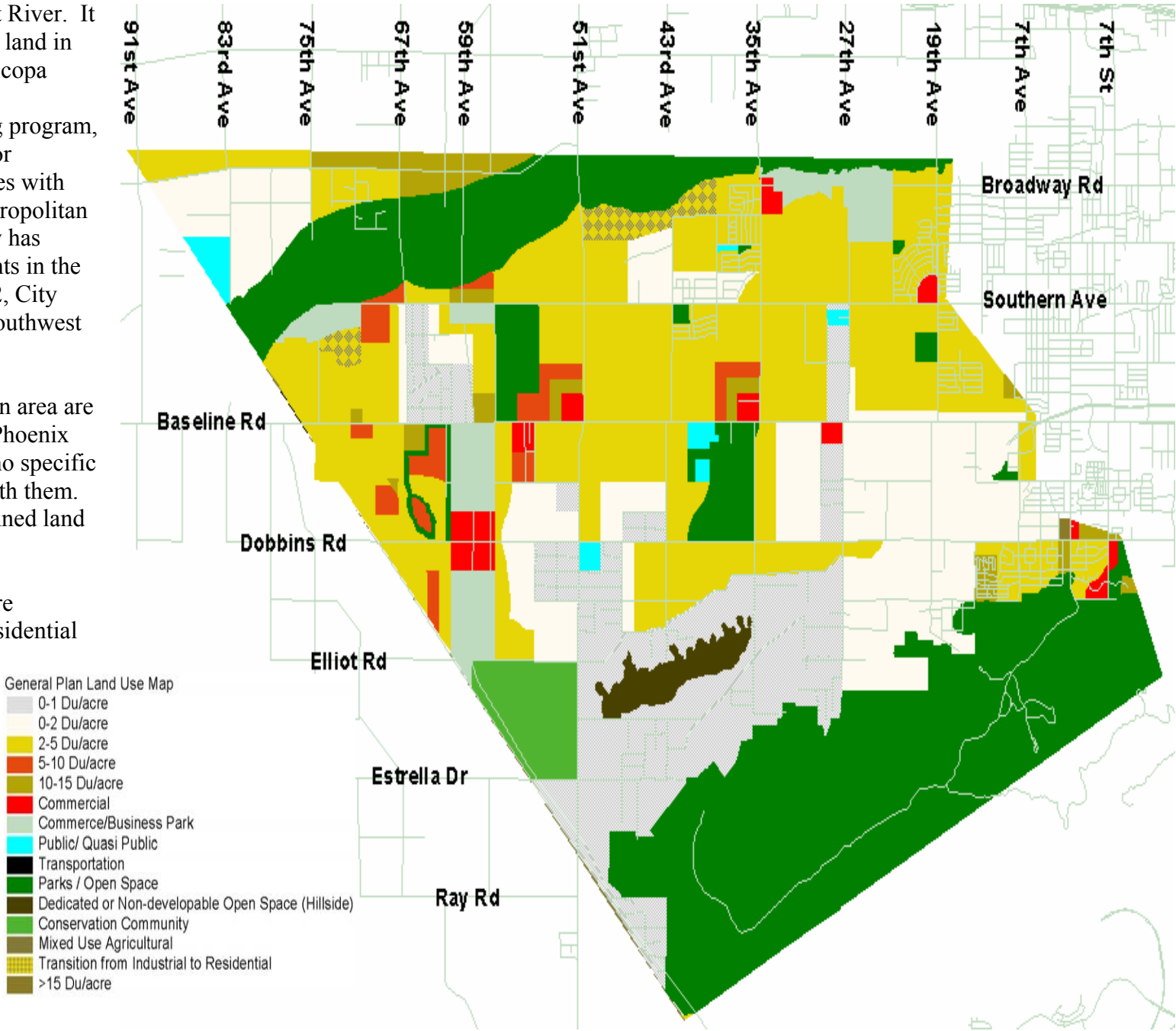


Figure 2-35: Laveen Land Planned Use

Source: Southwest Growth Study/Laveen Land Use Laveen General Plan Land Use (City of Phoenix) combined with the Maricopa Association of Governments General Plan Land Use.

Table 2: Laveen ADMP Study Area by Land Use

Use Description	Acreage	Area (%)
Transportation	2.9	<0.1%
>15 Du/acre	16.2	0.1%
Mixed Use Agricultural	42.4	0.1%
10-15 Du/acre	232.0	0.8%
Public/ Quasi Public	236.8	0.8%
Transition from Industrial to Residential	302.7	1.0%
Dedicated or Non-Developable	342.2	1.1%
Commercial	441.3	1.4%
5-15 Du/acre	485.9	1.6%
5-10 Du/acre	539.2	1.8%
Conservation Community	589.9	1.9%
Commerce/Business Park	997.7	3.2%
0-1 Du/acre	3885.9	12.6%
0-2 Du/acre	4758.3	15.5%
2-5 Du/acre	8775.3	28.6%
Parks/Open Space	9077.6	29.5%
	30,726 (48 sq. mi.)	100%

Source: Southwest Growth Study/Laveen Land Use Laveen General Plan Land Use (City of Phoenix) combined with the Maricopa Association of Governments General Plan Land Use.

The Southwest Growth Study/Laveen recognizes the importance of a rural lifestyle to current residents and seeks to balance current residents concerns with demands of new development. It includes ideas and design concepts for residential and commercial development and concepts for building, parking lot, open space and park and trail designs.

Other Plans applicable to the Study Area include the *Residential Design Guidelines for the Preservation of Rural Character: Laveen*, the *Laveen Watercourse/Green Belt Pedestrian Trail* and the Scenic Drive Designation included in the City of Phoenix General Plan. A General Plan Amendment for the area south of Baseline Road between 63rd and 59th Avenues (approximately) is also under consideration.

The *Residential Design Guidelines for the Preservation of Rural Character: Laveen* includes recommendations for subdivision design, walls, signs, street scapes, fencing, rooflines and housing footprints, porches and verandahs, trail system, and vegetation.

The *Laveen Watercourse/Green Belt Pedestrian Trail* has no formal plan but includes a schematic diagram showing a network of trails generally following a meandering 59th Avenue bordered on the east

by a park, and a greenbelt on the south and west sides of a loop road that extends from approximately 51st to 69th Avenues.

The Baseline Road Scenic Drive was approved as an Amendment to the City of Phoenix General Plan in July 1999. The Scenic Drive includes Baseline and Dobbins Roads, 51st Avenue between Baseline and Dobbins Roads and 59th Avenue from Estrella Drive to Southern Avenue. The scenic cross section would include a 14-foot median in 110 feet of right of way, and 24-foot medians and 50-foot landscaped setbacks along Baseline Road.

The proposed General Plan Amendment would result in changes in land uses along the Southwest loop from Commerce Park to C-2 and

Commerce Park/General Commerce Park, some higher intensity land uses at approximately 57th Avenue south of Baseline Road and a school site on the north side of West South Mountain Avenue.

Trails And Open Space

The Southwest Growth Area/Laveen, Laveen Watercourse/Green Belt Pedestrian Trail, Baseline Road Scenic Drive and proposed General Plan Amendment all include plans for open space and trails. In addition, the City of Phoenix and Maricopa County have designated on street bike lanes identified in their respective General and Comprehensive Plans. These plans are discussed as follows.

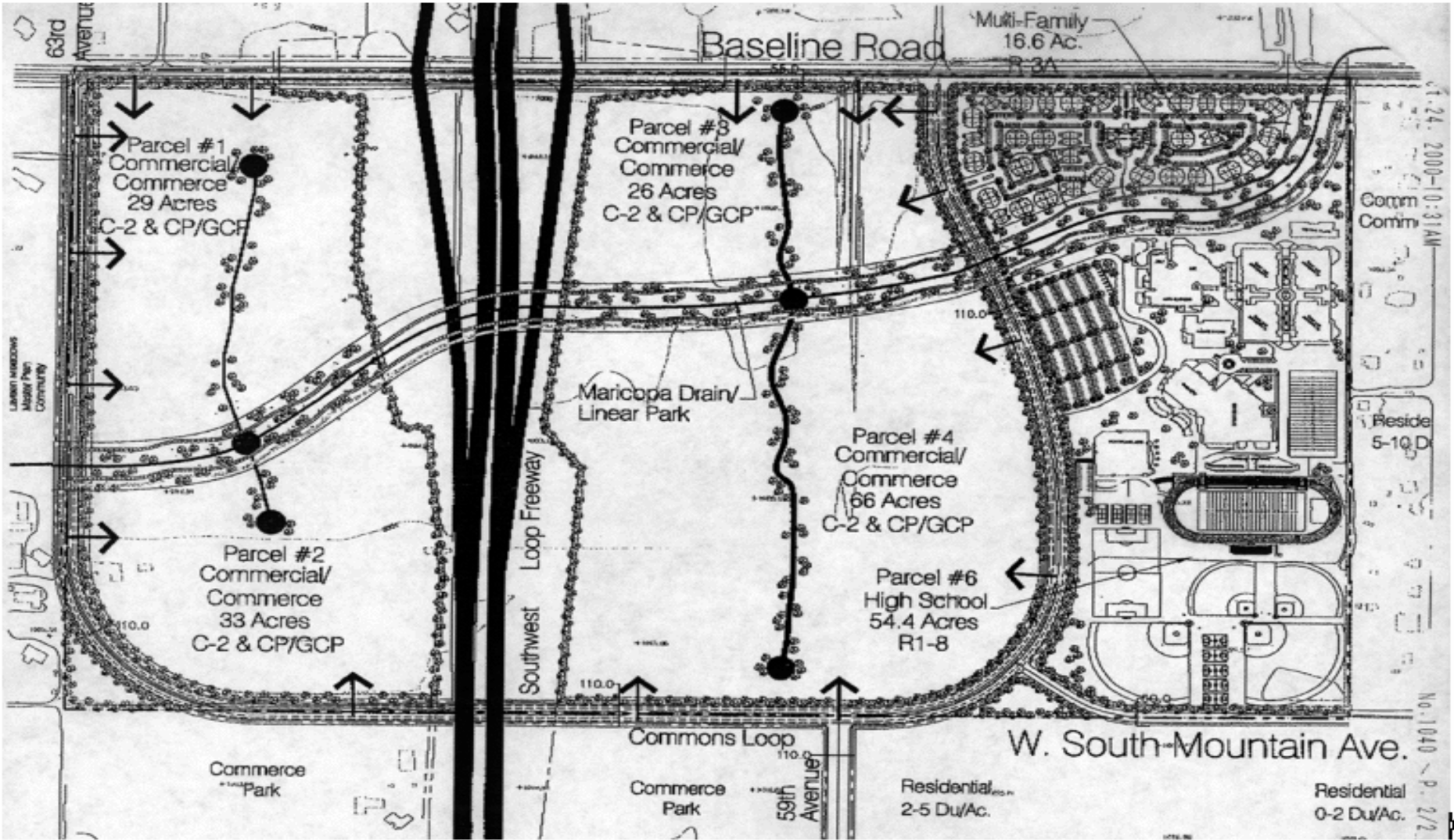


Figure 2-36: Sketch from the proposed General Plan Amendment

Bikeways

The City of Phoenix has planned for approximately 54 miles of on-street bike lanes within the study area (source: City of Phoenix, Maricopa County). These lanes are primarily along arterial streets.

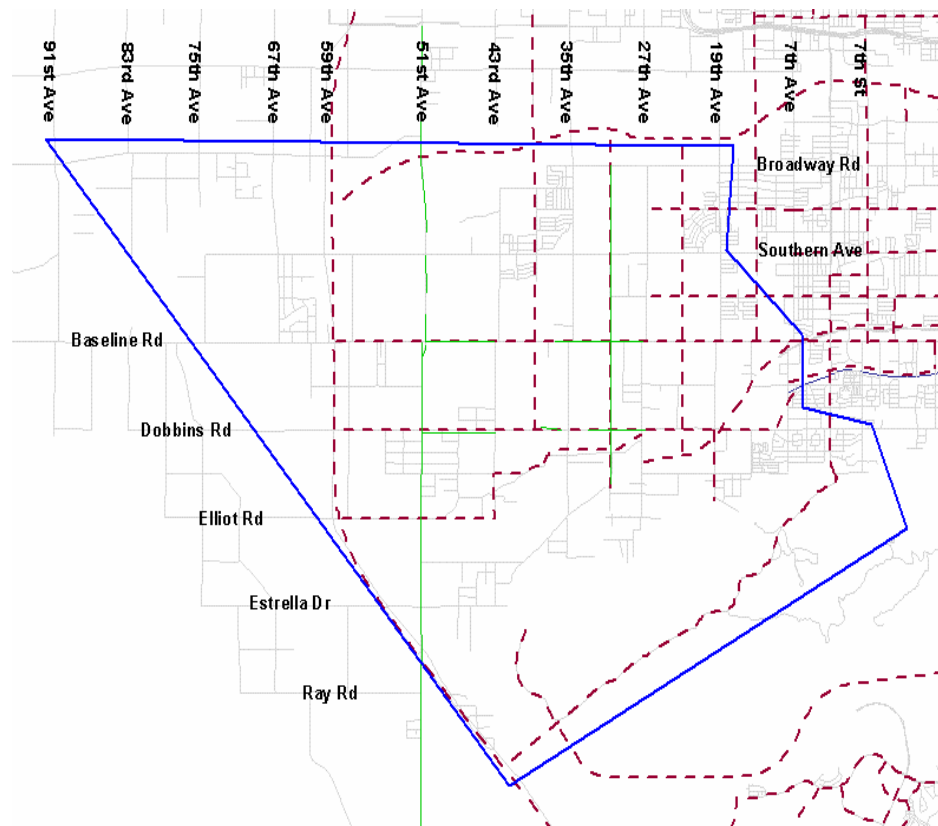


Figure 2-37: Existing and planned bike lanes for the Laveen ADMP study area

Source: City of Phoenix and Maricopa County

In addition, the Maricopa County Department of Transportation has an additional eight miles of trails planned for the area (source: Maricopa County Department of Transportation). It is unclear if these are planned to be on-street bike lanes or multi-use paths alongside major streets.

Trails

While there is a lack of formal designated shared used trails within the Study Area, canals and informal paths abound. Residents and the City have recognized that these paths and trails are integral to the rural character and feeling of community shared by residents in the

Study area. Consequently, all plans for the study area include trails and greenspaces. Each of these is discussed below.

The Southwest Area Growth Study/Laveen states that multiple use trails are a key component of the land use plan. The trails are planned to provide alternative transportation routes throughout Laveen and make connections to South Mountain Park at 27th Avenue, 35th Avenue, and Estrella Drive. They are also planned to provide Rio Salado Access at 27th Avenue, 43rd Avenue and 71st Avenue. An east-west trail is included as part of the Baseline Road Scenic Drive cross section, and canal banks are also identified as trail locations. Trails are also planned for commercial nodes at 35th and 51st Avenues and Baseline Road northwest through the higher density residential to school sites suggested in the middle of square miles. Trails are intended to provide access to schools, single family subdivisions, transit stops and commercial centers without requiring travel on major streets.

Laveen Watercourse/Green Belt Pedestrian Trail

The *Laveen Watercourse/Green Belt Pedestrian Trail* includes a schematic diagram showing a network of trails generally 59th Avenue bordered on the east by a park. It also incorporates a greenbelt on the south and west sides of a loop road extending from approximately 51st to 69th Avenues south of Baseline Road.

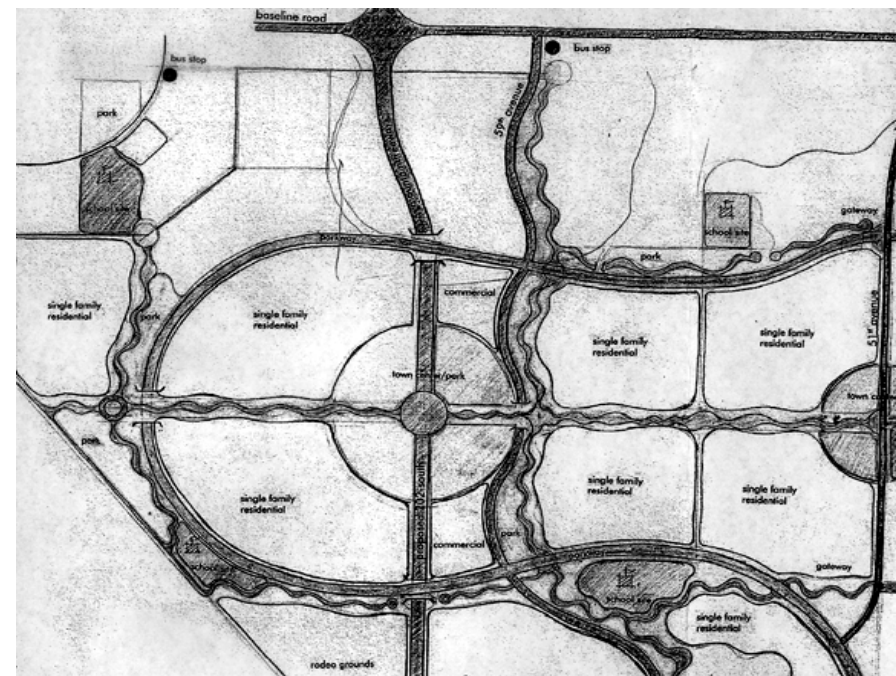


Figure 2-38: Laveen Watercourse/Greenbelt Pedestrian Trail

Proposed General Plan Amendment

The Southwest Area Growth Study/Laveen identifies several scenic drives through Laveen. These scenic drives may include easements or rights-of-way dedicated for the express purpose of equestrian, bicycle, or multi-use trails in addition to standard sidewalks.

Baseline and Dobbins Scenic Drives

Parks/Open Space

Existing parks within the Laveen area include the South Mountain Park, forming the southern boundary of the study area. South Mountain Park provides miles of hiking and riding trails. Caesar Chavez Park is a community park encompassing 352 acres on the southwest corner of 35th Avenue and Baseline Road. The park includes 25 acres of lakes with numerous recreational amenities. Finally, Playa Margarita Park is a neighborhood park located on Roeser Road between 36th and 37th Avenues.

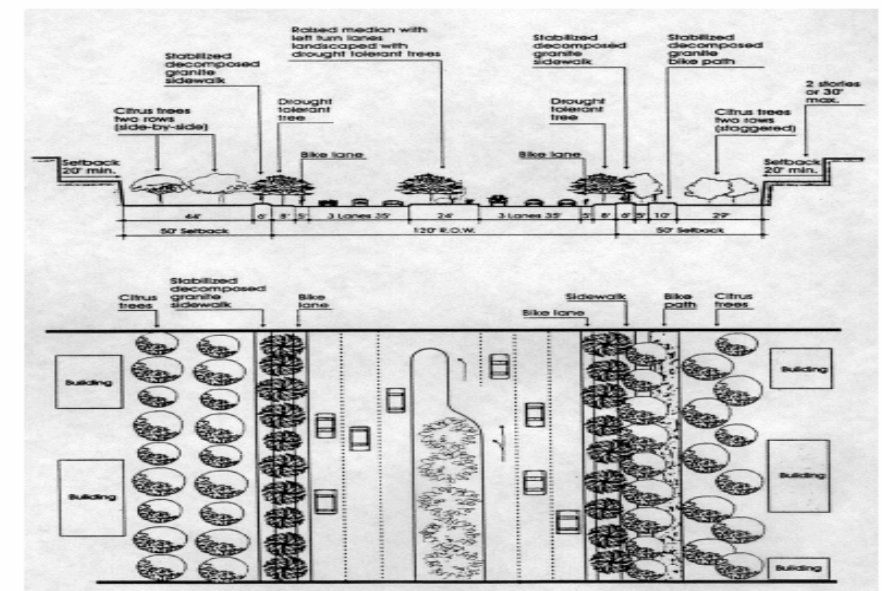


Figure 2-39: Sketch of scenic drive cross-section

The Residential Design Guidelines require that 20% of development be set aside for open space. In addition, the guide calls for developments to preserve, to the extent possible, natural drainage features such as washes and floodplains. The Laveen Elementary School District operates two schools within Laveen: Laveen Elementary (51st Avenue and Dobbins Road) and Cash Elementary School (35th Avenue and Roeser Road).

General Land Plan Use Summary

Several planning documents prepared by the City of Phoenix and Maricopa County relate to the Laveen area. While much of Laveen is in un-incorporated areas of Maricopa County, the City of Phoenix's *Southwest Growth Study Area/Laveen* covers all of the land west of 27th Avenue. The plan recognizes the importance of the rural lifestyle to the current residents and seeks to balance those concerns with the demands of new development. This plan indicates the largest land areas are reserved for large-lot residential and open space, thus preserving much of the rural nature of Laveen. Another planning document for Laveen, the Residential Design Guidelines prepared by the City of Phoenix, requires 20% of developments be set aside for open space.

Plans call for making extensive use of the existing canals as trails, providing alternative transportation routes throughout Laveen. Trails are intended to provide access to schools, single-family subdivisions, transit stops and commercial centers, as well as the Salt River and South Mountain Park.

ENVIRONMENTAL OVERVIEW

Physical Environment

The ADMP study area includes land under the jurisdiction of the City of Phoenix, the community of Laveen, State Land Department and Maricopa County. The focus area is located west of 43rd Avenue, north of the South Mountain Preserve, east of the Gila River Indian Reservation boundary, and south of the Salt River (see Figure 1-1). The legal location of the study area is: Township 1 North, Range 1 East, Sections 35 and 36; Township 1 North, Range 2 East, Sections 31-33; Township 1 South, Range 1 East, Section 1; and Township 1 South, Range 2 East, Sections 4-6, 7-9, 16-18, 20, 21, and 28.

The study area is located in the Basin and Range province of Arizona (Kamilli and Richard 1998) extends north from the western slopes of the South Mountain Preserve to the Salt River. The majority of the area is flat, with changes in contour present only at the base of South Mountain and on the northern boundary adjacent to the Salt River floodplain. The Salt River flows north of the north boundary of the study area and intersects with the Gila River approximately three miles west of the study area. The Gila River runs parallel to and within about 5 miles of the western study area boundary.

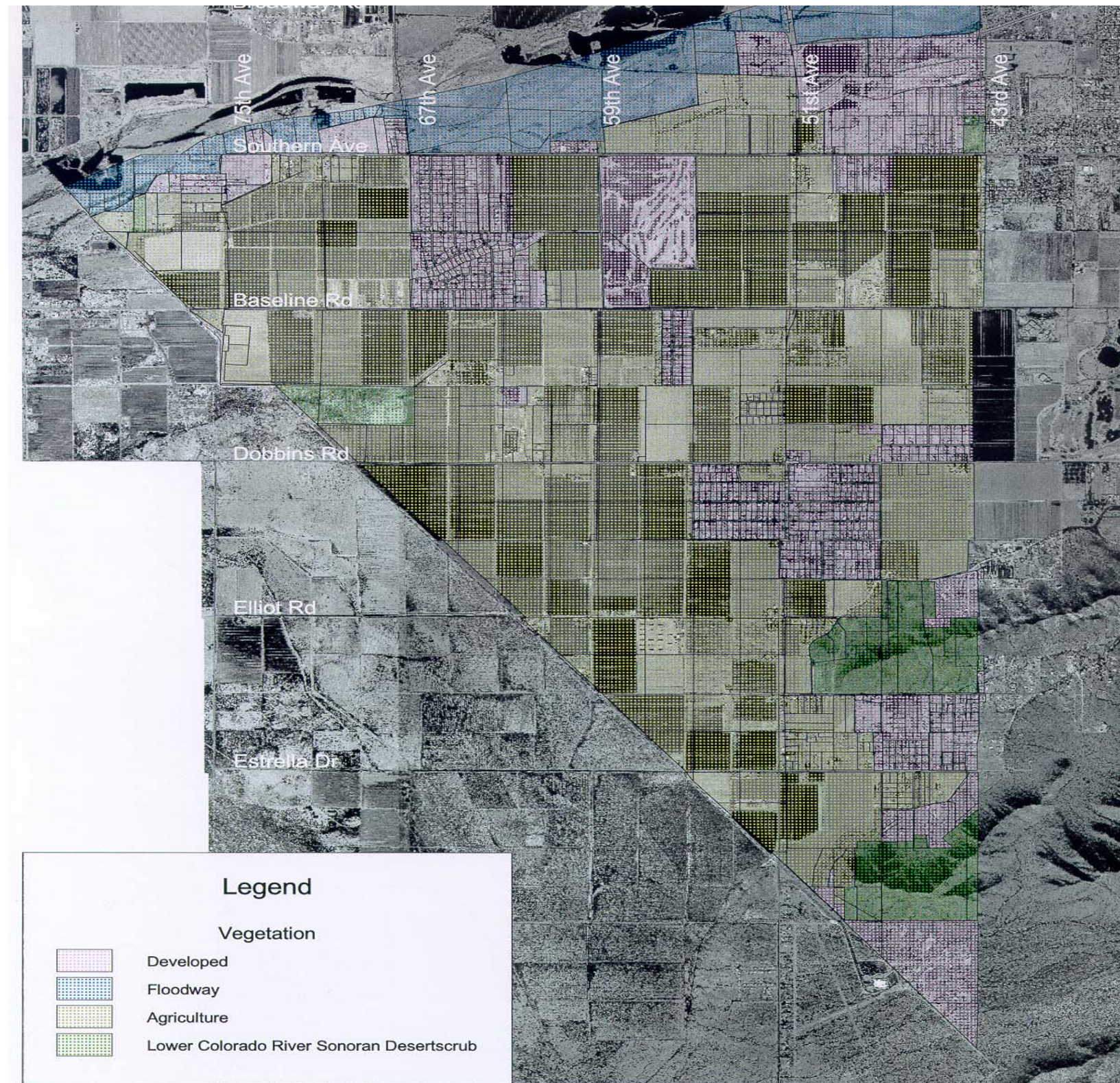


Figure 2-40: Vegetation Map for Laveen ADMP

Vegetation

Vegetation within the study area is classified as ecotonal between creosote-white bursage series of Lower Colorado River Sonoran Desertscrub subdivision and the paloverde-cacti series of Arizona Upland Sonoran Desertscrub subdivision (Brown 1994).

However, due to human disturbance native vegetation within the study area is primarily limited to the Carver Mountain area and the western slopes of South Mountain (see Figure 2-40).

Native vegetation within the study area includes: creosote (*Larrea tridentata*), triangle-leaf bursage (*Ambrosia deltoidea*), ironwood (*Olneya tesota*), mesquite (*Prosopis* sp.), blue paloverde (*Cercidium floridum*), little-leaf paloverde (*Cercidium microphyllum*), saguaro



Figure 2-41: Saguaro

(*Carnegiea gigantea*), barrel cactus (*Ferocactus wislizenii*), teddybear cholla (*Opuntia bigelovii*), buckhorn cholla (*Opuntia* sp.), and desert broom (*Baccharis sarothroides*). Xeroriparian vegetation occurs along washes. Disturbed habitat includes agriculture fields, urban, and suburban housing developments. Vegetation within the disturbed habitat is primarily non-native.

Lower Colorado River Valley subdivision vegetation was likely the characteristic cover type of most of the area between the base of South Mountain and the Salt River. This area has been converted to agriculture, industrial, and housing developments. Washes once dissecting the area, are no longer evident. Carver Hills and the western slopes of South Mountain demonstrates the ecotonal vegetation characteristic of the two subdivisions. Following is a brief description of characteristic features of the two subdivisions.

Lower Colorado River Subdivision

This habitat is typically flat, with a one to two percent slope. Species once commonly found along larger drainageways include small trees such as: western honey mesquite (*Prosopis glandulosa*), ironwood, blue paloverde, and smoketree (*Psoralea argophylla*) (Brown 1994). Each of these species, except for smoketree, may also be found outside of xeroriparian habitat. This habitat differs structurally from Arizona Upland Sonoran Desertscrub by the poorer

representation or absence of little-leaf paloverde and velvet mesquite (*Prosopis velutina*).

Interfluvial flats in this habitat are dominated by creosote bush, and triangle-leaf bursage. Saltbush (*Atriplex* spp.), and jimmyweed (*Happlopappus heterophyllus*) are also common, and catclaw acacia (*Acacia greggii*) is also present. Barrel cactus, ocotillo (*Fouquieria splendens*), and saguaro are widely scattered throughout this habitat, primarily at higher elevations (Brown 1994).

This subdivision has the lowest diversity of wildlife species in the Sonoran desert because of the relatively sparse vegetation and limited plant species diversity. Species that may be present in this habitat are listed in Table 3. The round-tailed ground squirrel (*Spermophilus tereticaudus*) is characteristic of this habitat. Other common mammals include the coyote (*Canis latrans*), kit fox (*Vulpes macrotis*), white-tailed antelope squirrel (*Ammospermophilus leucurus*), desert pocket mouse (*Perognathus penicillatus*), long-tailed pocket mouse (*Perognathus formosus*), and desert kangaroo rat (*Dipodomys deserti*) (Brown 1994). This is the poorest subdivision for birds, the only diagnostic bird is Leconte’s Thrasher (*Toxostoma lecontei*). Other common bird species include Turkey Vulture (*Cathartes aura*) and Mourning Dove (*Zenaida macroura*).

Arizona Upland Subdivision

Arizona Upland subdivision paloverde-cacti-mixed scrub series of Sonoran Desertscrub is represented by a relatively larger density of



Figure 2-42: Hillside within Arizona Upland Subdivision

tree species and cacti. Dominant plant species include saguaro and foothill paloverde, with smaller numbers of blue paloverde, ironwood, mesquite, cat-claw acacia, and triangle-leaf bursage. Cholla and barrel cactus are also present.

Xeroriparian habitats are also present in the Arizona Upland subdivision. These habitats are long, narrow corridors adjacent to ephemeral washes. Plant species in the xeroriparian habitats are similar to those in Arizona Upland, but occur with higher densities of ironwood, honey mesquite, and blue paloverde.

The Arizona Upland subdivision generally supports a greater variety of wildlife species than the Lower Colorado River subdivision, as listed in Table 3. This is due to greater topographic relief, higher vegetation densities, and greater plant species diversity. Common mammals in this habitat include the black-tailed jackrabbit (*Lepus californicus*), white-throated wood rat (*Neotoma albigula*), Harris’ antelope squirrel (*Ammospermophilus harrisi*), and several species of bats. This series is noted for its rich birdlife. Some characteristic bird species include Harris’ Hawk (*Parabuteo unicinctus*), White-winged Dove (*Zenaida macroura*), Gambel’s quail (*Callipepla gambelii*), Gilded Flicker (*Colaptes chrysoides*), Cactus Wren (*Campylorhynchus brunneicapillus*), and Curve-billed Thrasher (*Toxostoma curvirostre*) (Brown 1994).

Agricultural Land

Agricultural land covers the majority of the study area, particularly northwest of Carver Hills. Conversion of desertscrub to agriculture



Figure 2-43: Agricultural Land

requires the complete removal of native vegetation. Land in this classification includes fallow fields, recently plowed fields, cotton crops, and plant nurseries.

The quality and potential for wildlife use varies with the type of crop, growth cycle stage, and intensity of irrigation. Irrigated lands increase and change the diversity of animal species that could be present.

Wildlife species present in this habitat must be able to tolerate a high level of human activity. Some typical mammals in the agricultural areas include black-tailed jackrabbit, Botta’s pocket gopher (*Thomomys bottae*), cactus mouse (*Peromyscus eremicus*), and coyote. Many bird species are able to forage in agricultural areas, although they might need other areas for cover. Some common birds include Burrowing Owl (*Athene cunicularia*) (see Figure 2-44), Killdeer (*Charadrius vociferus*), Greater Roadrunner (*Geococcyx californianus*), Horned Lark (*Eremophiila alpestris*), Vesper Sparrow (*Pooecetes gramineus*), and Brown-headed Cowbird (*Molothrus ater*). Raptors are common in agricultural areas where they can



Figure 2-44: Burrowing Owls

easily forage on insects and rodents. The most common raptors are red-tailed hawks (*Buteo jamaicensis*) and American Kestrel (*Falco sparverius*), with Northern Harrier (*Circu cyaneus*) present in the winter.

The periodicity of agriculture practices limits suitability of habitat for reptiles. However, irrigation canals can provide suitable habitat for many amphibian species. Some species that could occur include the tree lizard, gopher snake (*Pituophis melanoleucus*), and western diamond rattlesnake (*Crotalus atrox*).

Urban Development



Figure 2-45: Urban development within the Laveen ADMP study area

The urban development within the study area is interspersed with agriculture areas. Urban development includes low-density residential areas, high-density residential areas, commercial and industrial sites, schools, and recreation areas such as a golf course and informal horse trails. The area of urban development within the area is increasing, with the conversion of agriculture lands to housing communities.

The presence of wildlife in an urban environment is dependent on the extent of removal of native vegetation and the intensity of human activities. High-density residential areas and commercial and industrial properties will support very few species. North of Carver Hills and South Mountain very little native vegetation exists, however low-density residential areas offer a lower intensity of human activity.

Mammals able to adapt to high levels of human activity include the desert cottontail (*Sylvilagus audubonii*), house mouse (*Mus musculus*), and coyote. Several species of bats could forage for insects in urban areas. Bird species common in urban environments include Rock Dove (*Columba livia*), European Starling (*Sturnus vulgaris*), Great-tailed Grackle (*Quiscalus mexicanus*), House Finch (*Carpodacus mexicanus*), and House Sparrow (*Passer domesticus*). Reptiles and amphibians, other than the introduced Mediterranean gecko (*Hemidactylus turcicus*), are generally poorly represented in urban environments.

Table 3: Mammal species that could occur in vegetative communities present in the Laveen ADMP focus area A – Lower Colorado River B – Xeroriparian Washes C – Sonoran Upland Desertscrub D – Agriculture Areas E – Urban Area F – Canals, Ponds, Lakes

Common Name	Scientific Name	A	B	C	D	E	F
Desert shrew	<i>Notiosorex crawfordi</i>	Y	Y	Y			
California-leaf nosed bat	<i>Macrotus californicus</i>	Y	Y	Y	Y		
Lesser long-nosed bat	<i>Leptonycteris curasoae</i>	Y	Y	Y			
Yuma myotis	<i>Myotis yumanensis</i>						Y
Cave myotis	<i>Myotis velifer</i>	Y	Y	Y	Y	Y	Y
California myotis	<i>Myotis californicus</i>	Y	Y	Y	Y	Y	Y
Western pipistrelle	<i>Pipistrellus hesperus</i>	Y	Y	Y	Y	Y	Y
Big brown bat	<i>Eptesicus fuscus</i>	Y	Y	Y	Y	Y	Y
Southern yellow bat	<i>Lasiurus ega</i>	Y	Y	Y	Y	Y	Y
Townsend’s big-eared bat	<i>Corynorhinus townsendii</i>	Y	Y	Y	Y	Y	Y
Pallid bat	<i>Antrozous pallidus</i>	Y	Y	Y	Y	Y	Y
Brazilian free-tailed bat	<i>Tadarida brasiliensis</i>	Y	Y	Y	Y	Y	Y
Pocketed free-tailed bat	<i>Nyctinomops femorosaccus</i>	Y	Y	Y	Y	Y	Y
Big free-tailed bat	<i>Nyctinomops macrotis</i>	Y	Y	Y	Y	Y	Y
Western mastiff bat	<i>Eumops perotis</i>	Y	Y	Y	Y	Y	Y
Desert cottontail *	<i>Sylvilagus audubonii</i>	Y	Y	Y	Y	Y	
Black-tailed jackrabbit	<i>Lepus californicus</i>	Y	Y	Y	Y	Y	
Harris’ antelope squirrel	<i>Ammospermophilus harrisi</i>	Y	Y	Y	Y	Y	
Rock squirrel	<i>Spermophilus variegatus</i>	Y	Y	Y	Y		
Round-tailed ground squirrel	<i>Spermophilus tereticaudus</i>	Y	Y	Y	Y	Y	
Botta’s pocket gopher	<i>Thomomys bottae</i>	Y	Y	Y	Y	Y	
Little pocket mouse	<i>Perognathus longimembris</i>	Y					
Arizona pocket mouse	<i>Perognathus amplus</i>	Y		Y			
Desert pocket mouse	<i>Chaetodipus penicillatus</i>	Y	Y	Y	Y		
Bailey’s pocket mouse	<i>Chaetodipus baileyi</i>	Y	Y	Y	Y		
Rock pocket mouse	<i>Chaetodipus intermedius</i>			Y			
Merriam’s kangaroo rat	<i>Dipodomys merriami</i>	Y		Y			
Desert kangaroo rat	<i>Dipodomys deserti</i>	Y	Y				
Western harvest mouse	<i>Reithrodontomys megalotis</i>	Y	Y	Y	Y		
Cactus mouse	<i>Peromyscus eremicus</i>	Y	Y	Y	Y		
Deer mouse	<i>Peromyscus maniculatus</i>						
Southern grasshopper mouse	<i>Onychomys torridus</i>	Y	Y	Y			
Arizona cotton rat	<i>Sigmodon arizonae</i>	Y	Y	Y	Y		Y
White-throated wood rat	<i>Neotoma albigula</i>	Y	Y	Y			
Desert wood rat	<i>Neotoma lepida</i>	Y	Y	Y			
House mouse	<i>Mus musculus</i>						Y
Coyote *	<i>Canis latrans</i>	Y	Y	Y	Y	Y	Y
Kit fox	<i>Vulpes macrotis</i>	Y	Y				
Gray fox	<i>Urocyon cinereoargenteus</i>	Y	Y	Y			
Ringtail	<i>Bassariscus astutus</i>	Y	Y	Y			
Raccoon	<i>Procyon lotor</i>					Y	Y
Badger	<i>Taxidea taxus</i>	Y	Y	Y	Y		
Spotted skunk	<i>Spilogale gracilis</i>	Y	Y	Y			
Striped skunk	<i>Mephitis mephitis</i>				Y		
Mountain lion	<i>Felis concolor</i>			Y			
Bobcat	<i>Felis rufus</i>	Y	Y	Y	Y		
Collared peccary	<i>Tayassu tajacu</i>		Y	Y			
Mule deer	<i>Odocoileus hemionus</i>	Y	Y	Y			
Bighorn sheep	<i>Ovis canadensis</i>			Y			
Otter*	NOT IDENTIFIED						Y
Pied-billed grebe	<i>Podilymbus podiceps</i>						Y
Eared grebe	<i>Podiceps nigricollis</i>						Y
Great blue heron*	<i>Ardea herodias</i>						Y
Great egret	<i>A. alba</i>				Y		Y

Common Name	Scientific Name	A	B	C	D	E	F
Snowy egret*	<i>Egretta thula</i>						Y
Cattle egret	<i>Bubulcus ibis</i>				Y		Y
Green heron	<i>Butorides virescens</i>						Y
Black-crowned night-heron	<i>Nycticorax nycticorax</i>						Y
Canada goose	<i>Branta canadensis</i>				Y		Y
Green-winged teal	<i>Anas crecca</i>						Y
Mallard	<i>A. platyrhynchos</i>				Y	Y	Y
Northern pintail	<i>A. acuta</i>						Y
Blue-winged teal	<i>A. discors</i>						Y
Cinnamon teal	<i>A. cyanoptera</i>						Y
Northern Shoveler	<i>A. clypeata</i>						Y
Gadwall	<i>A. strepera</i>				Y		Y
American wigeon	<i>A. americana</i>				Y		Y
Canvasback	<i>Aythya valisineria</i>						Y
Redhead	<i>A. americana</i>						Y
Ring-necked duck	<i>A. collaris</i>						Y
Lesser scaup	<i>A. affinis</i>						Y
Bufflehead	<i>Bucephala albeola</i>						Y
Common merganser	<i>Mergus merganser</i>						Y
Ruddy duck	<i>Oxyura jamaicensis</i>						Y
Turkey vulture*	<i>Cathartes aura</i>	Y	Y	Y	Y	Y	
Northern harrier	<i>Circus cyaneus</i>	Y		Y	Y		Y
Sharp-shinned hawk	<i>Accipiter striatus</i>	Y	Y	Y	Y	Y	
Cooper’s hawk	<i>A. cooperii</i>	Y	Y	Y	Y	Y	
Gray hawk	<i>Asturina nitida</i>				Y		
Harris’ hawk	<i>Parabuteo unicinctus</i>	Y	Y	Y	Y	Y	
Swainson’s hawk	<i>Buteo swainsoni</i>	Y		Y	Y		
Red-tailed hawk*	<i>B. jamaicensis</i>	Y	Y	Y	Y	Y	
Ferruginous hawk	<i>B. regalis</i>	Y			Y		
American kestrel	<i>Falco sparverius</i>	Y	Y	Y	Y	Y	
Prairie falcon	<i>F. mexicanus</i>	Y	Y	Y	Y	Y	
Peregrine falcon	<i>F. peregrinus</i>	Y	Y	Y	Y	Y	Y
Gambel's quail*	<i>Callipepla gambelii</i>	Y	Y	Y	Y	Y	
Virginia rail	<i>Rallus limicola</i>						Y
Sora	<i>Porzana carolina</i>						Y
Common moorhen	<i>Gallinula chloropus</i>						Y
American coot	<i>Fulica americana</i>						Y
Semipalmated plover	<i>Charadrius semipalmatus</i>						Y
Killdeer*	<i>C. vociferus</i>				Y	Y	Y
Black-necked stilt	<i>Himantopus mexicanus</i>						Y
American avocet	<i>Recurvirostra americana</i>						Y
Greater yellowlegs	<i>Tringa melanoleuca</i>				Y		Y
Lesser yellowlegs	<i>T. flavipes</i>				Y		Y
Spotted sandpiper	<i>Actitis macularia</i>						Y
Long-billed curlew	<i>Numenius americanus</i>				Y		Y
Western sandpiper	<i>Calidris mauri</i>						Y
Least sandpiper	<i>C. minutilla</i>						Y
Baird’s sandpiper	<i>C. bairdii</i>						Y
Pectoral sandpiper	<i>C. melanotus</i>						Y
Long-billed dowitcher	<i>Limnodromus scolopaceus</i>						Y
Common snipe	<i>Gallinago gallinago</i>				Y		Y
Wilson’s phalarope	<i>Phalaropus tricolor</i>						Y
Red-necked phalarope	<i>P. lobatus</i>						Y
Ring-billed gull	<i>Larus delawarensis</i>				Y		Y

Common Name	Scientific Name	A	B	C	D	E	F
Forster's tern	<i>Sterna forsteri</i>						Y
Rock dove	<i>Columba livia</i>				Y	Y	
White-winged dove	<i>Zenaida asiatica</i>	Y	Y	Y	Y	Y	
Mourning dove*	<i>Zenaida macroura</i>	Y	Y	Y	Y	Y	
Inca dove	<i>Columbina inca</i>	Y	Y	Y	Y	Y	
Common ground-dove	<i>C. passerina</i>	Y	Y		Y		
Greater roadrunner*	<i>Geococcyx californianus</i>	Y	Y	Y	Y	Y	
Western screech-owl	<i>Asio kennicottii</i>		Y	Y		Y	
Great horned owl	<i>Bubo virginianus</i>		Y	Y	Y	Y	
Elf owl	<i>Micrathene whitneyi</i>	Y	Y	Y			
Burrowing owl*	<i>Athene cunicularia</i>	Y		Y	Y		
Short-eared owl	<i>Asio flammeus</i>				Y		
Lesser nighthawk*	<i>Chordeiles acutipennis</i>	Y		Y	Y		
Common poorwill	<i>Phalaenoptilus nuttallii</i>	Y		Y			
White-throated swift	<i>Aeronautes saxatalis</i>					Y	Y
Black-chinned hummingbird	<i>Archilochus alexandri</i>		Y			Y	
Anna’s hummingbird*	<i>Calypte anna</i>		Y		Y	Y	
Costa’s hummingbird	<i>C. costae</i>	Y	Y	Y			
Rufous hummingbird	<i>Selasphorus rufus</i>		Y			Y	
Belted kingfisher	<i>Ceryle alcyon</i>						Y
Gila woodpecker*	<i>Melanerpes uropygialis</i>	Y	Y	Y	Y	Y	
Red-naped sapsucker	<i>Sphyrapicus nuchalis</i>		Y			Y	
Ladder-backed woodpecker	<i>Picoides scalaris</i>	Y	Y	Y			
Northern flicker	<i>Colaptes auratus</i>		Y	Y		Y	
Gilded flicker	<i>C. chrysoides</i>	Y	Y	Y			
Western wood-pewee	<i>Contopus sordidulus</i>		Y			Y	
Hammond’s flycatcher	<i>Empidonax hammondii</i>		Y				
Kit fox	<i>Vulpes macrotis</i>	Y	Y				
Gray fox	<i>Urocyon cinereoargenteus</i>	Y	Y	Y			
Ringtail	<i>Bassariscus astutus</i>	Y	Y	Y			
Raccoon	<i>Procyon lotor</i>					Y	Y
Badger	<i>Taxidea taxus</i>	Y	Y	Y	Y		
Spotted skunk	<i>Spilogale gracilis</i>	Y	Y	Y			
Striped skunk	<i>Mephitis mephitis</i>				Y		
Mountain lion	<i>Felis concolor</i>			Y			
Bobcat	<i>Felis rufus</i>	Y	Y	Y	Y		
Collared peccary	<i>Tayassu tajacu</i>		Y	Y			
Mule deer	<i>Odocoileus hemionus</i>	Y	Y	Y			

Table 3: Mammal species that could occur in vegetative communities present in the Laveen ADMP focus area A – Lower Colorado River B – Xeroriparian Washes C – Sonoran Upland Desertscrub D – Agriculture Areas E – Urban Areas F – Canals, Ponds, Lakes

Common Name	Scientific Name	A	B	C	D	E	F
Bighorn sheep	<i>Ovis canadensis</i>			Y			
Otter*	NOT IDENTIFIED						Y
Pied-billed grebe	<i>Podilymbus podiceps</i>						Y
Eared grebe	<i>Podiceps nigricollis</i>						Y
Great blue heron*	<i>Ardea herodias</i>						Y
Great egret	<i>A. alba</i>				Y		Y
Snowy egret*	<i>Egretta thula</i>						Y
Cattle egret	<i>Bubulcus ibis</i>				Y		Y
Green heron	<i>Butorides virescens</i>						Y
Black-crowned night-heron	<i>Nycticorax nycticorax</i>						Y
Canada goose	<i>Branta canadensis</i>				Y		Y
Green-winged teal	<i>Anas crecca</i>						Y
Mallard	<i>A. platyrhynchos</i>				Y	Y	Y
Northern pintail	<i>A. acuta</i>						Y
Blue-winged teal	<i>A. discors</i>						Y
Cinnamon teal	<i>A. cyanoptera</i>						Y
Northern Shoveler	<i>A. clypeata</i>						Y
Gadwall	<i>A. strepera</i>				Y		Y
American wigeon	<i>A. americana</i>				Y		Y
Canvasback	<i>Aythya valisineria</i>						Y
Redhead	<i>A. americana</i>						Y
Ring-necked duck	<i>A. collaris</i>						Y
Lesser scaup	<i>A. affinis</i>						Y
Bufflehead	<i>Bucephala albeola</i>						Y
Common merganser	<i>Mergus merganser</i>						Y
Ruddy duck	<i>Oxyura jamaicensis</i>						Y
Turkey vulture*	<i>Cathartes aura</i>	Y	Y	Y	Y	Y	
Northern harrier	<i>Circus cyaneus</i>	Y		Y	Y		Y
Sharp-shinned hawk	<i>Accipiter striatus</i>	Y	Y	Y	Y	Y	
Cooper’s hawk	<i>A. cooperii</i>	Y	Y	Y	Y	Y	
Gray hawk	<i>Asturina nitida</i>				Y		
Harris’ hawk	<i>Parabuteo unicinctus</i>	Y	Y	Y	Y	Y	
Swainson’s hawk	<i>Buteo swainsoni</i>	Y		Y	Y		
Red-tailed hawk*	<i>B. jamaicensis</i>	Y	Y	Y	Y	Y	
Ferruginous hawk	<i>B. regalis</i>	Y			Y		
American kestrel	<i>Falco sparverius</i>	Y	Y	Y	Y	Y	
Prairie falcon	<i>F. mexicanus</i>	Y	Y	Y	Y	Y	
Peregrine falcon	<i>F. peregrinus</i>	Y	Y	Y	Y	Y	Y
Gambel's quail*	<i>Callipepla gambelii</i>	Y	Y	Y	Y	Y	
Virginia rail	<i>Rallus limicola</i>						Y
Sora	<i>Porzana carolina</i>						Y
Common moorhen	<i>Gallinula chloropus</i>						Y
American coot	<i>Fulica americana</i>						Y
Semipalmated plover	<i>Charadrius semipalmatus</i>						Y
Killdeer*	<i>C. vociferus</i>				Y	Y	Y
Black-necked stilt	<i>Himantopus mexicanus</i>						Y
American avocet	<i>Recurvirostra americana</i>						Y
Greater yellowlegs	<i>Tringa melanoleuca</i>				Y		Y
Lesser yellowlegs	<i>T. flavipes</i>				Y		Y

Common Name	Scientific Name	A	B	C	D	E	F
Spotted sandpiper	<i>Actitis macularia</i>						Y
Long-billed curlew	<i>Numenius americanus</i>				Y		Y
Western sandpiper	<i>Calidris mauri</i>						Y
Least sandpiper	<i>C. minutilla</i>						Y
Baird’s sandpiper	<i>C. bairdii</i>						Y
Pectoral sandpiper	<i>C. melanotos</i>						Y
Long-billed dowitcher	<i>Limnodromus scolopaceus</i>						Y
Common snipe	<i>Gallinago gallinago</i>				Y		Y
Wilson’s phalarope	<i>Phalaropus tricolor</i>						Y
Red-necked phalarope	<i>P. lobatus</i>						Y
Ring-billed gull	<i>Larus delawarensis</i>				Y		Y
Forster's tern	<i>Sterna forsteri</i>						Y
Rock dove	<i>Columba livia</i>				Y	Y	
White-winged dove	<i>Zenaida asiatica</i>	Y	Y	Y	Y	Y	
Mourning dove*	<i>Zenaida macroura</i>	Y	Y	Y	Y	Y	
Inca dove	<i>Columbina inca</i>	Y	Y	Y	Y	Y	
Common ground-dove	<i>C. passerina</i>	Y	Y		Y		
Greater roadrunner*	<i>Geococcyx californianus</i>	Y	Y	Y	Y	Y	
Western screech-owl	<i>Asio kennicottii</i>		Y	Y		Y	
Great horned owl	<i>Bubo virginianus</i>		Y	Y	Y	Y	
Elf owl	<i>Micrathene whitneyi</i>	Y	Y	Y			
Burrowing owl*	<i>Athene cunicularia</i>	Y		Y	Y		
Short-eared owl	<i>Asio flammeus</i>				Y		
Lesser nighthawk*	<i>Chordeiles acutipennis</i>	Y		Y	Y		
Common poorwill	<i>Phalaenoptilus nuttallii</i>	Y		Y			
White-throated swift	<i>Aeronautes saxatalis</i>					Y	Y
Black-chinned hummingbird	<i>Archilochus alexandri</i>		Y			Y	
Anna’s hummingbird*	<i>Calypte anna</i>		Y		Y	Y	
Costa’s hummingbird	<i>C. costae</i>	Y	Y	Y			
Rufous hummingbird	<i>Selasphorus rufus</i>		Y			Y	
Belted kingfisher	<i>Ceryle alcyon</i>						Y
Gila woodpecker*	<i>Melanerpes uropygialis</i>	Y	Y	Y	Y	Y	
Red-naped sapsucker	<i>Sphyrapicus nuchalis</i>		Y			Y	
Ladder-backed woodpecker	<i>Picoides scalaris</i>	Y	Y	Y			
Northern flicker	<i>Colaptes auratus</i>		Y	Y		Y	
Gilded flicker	<i>C. chrysoides</i>	Y	Y	Y			
Western wood-pewee	<i>Contopus sordidulus</i>		Y			Y	
Hammond’s flycatcher	<i>Empidonax hammondii</i>		Y				
Dusky flycatcher	<i>E. oberholseri</i>	Y	Y	Y			
Gray flycatcher	<i>E. wrightii</i>		Y		Y		
Pacific-slope flycatcher	<i>E. difficilis</i>	Y	Y	Y			
Black phoebe	<i>Sayornis nigricans</i>		Y				Y
Say's phoebe	<i>Sayornis saya</i>	Y	Y	Y	Y	Y	
Vermilion flycatcher	<i>Pyrocephalus rubinus</i>		Y		Y		Y
Ash-throated flycatcher	<i>Myiarchus cinerascens</i>		Y	Y			
Brown-crested flycatcher	<i>M. tyrannulus</i>		Y				
Western kingbird	<i>Tyrannus verticalis</i>	Y	Y	Y	Y	Y	
Horned lark	<i>Eremophila alpestris</i>	Y			Y		
Tree swallow	<i>Tachycineta bicolor</i>						Y

Common Name	Scientific Name	A	B	C	D	E	F
Violet-green swallow	<i>T. thalassina</i>						Y
Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>						Y
Bank swallow	<i>Riparia riparia</i>						Y
Cliff swallow	<i>Petrochelidon pyrrhonota</i>					Y	Y
Barn swallow	<i>Hirundo rustica</i>				Y	Y	Y
Common raven*	<i>Corvus corax</i>	Y	Y	Y	Y		
Verdin*	<i>Auriparus flaviceps</i>	Y	Y	Y		Y	
Cactus wren*	<i>Campylorhynchus brunneicapillus</i>	Y	Y	Y		Y	
Rock wren	<i>Salpinctes obsoletus</i>	Y	Y	Y			
Canyon wren	<i>Catherpes mexicanus</i>			Y			
Bewick’s wren	<i>Thryomanes bewickii</i>		Y			Y	
House wren	<i>Troglodytes aedon</i>		Y				
Marsh wren	<i>Cistothorus palustris</i>						Y
Ruby-crowned kinglet	<i>Regulus calendula</i>	Y	Y	Y		Y	
Black-tailed gnatcatcher	<i>Poliopitila melanura</i>	Y	Y	Y			
Western bluebird	<i>Sialia mexicana</i>		Y		Y		
American robin	<i>Turdus migratorius</i>				Y	Y	
Northern mockingbird*	<i>Mimus polyglottos</i>	Y	Y	Y	Y	Y	
Sage thrasher	<i>Oreoscoptes montanus</i>	Y		Y			
Bendire’s thrasher	<i>Toxostoma bendirei</i>	Y	Y	Y	Y		
Curve-billed thrasher*	<i>T. curvirostre</i>		Y	Y		Y	
Crissal thrasher	<i>T. crissale</i>		Y				
LeConte’s thrasher	<i>T. lecontei</i>	Y					
American pipit	<i>Anthus rubescens</i>				Y	Y	Y
Cedar waxwing	<i>Bombycilla cedrorum</i>					Y	
Phainopepla*	<i>Phainopepla nitens</i>	Y	Y	Y			
Loggerhead shrike	<i>Lanius ludovicianus</i>	Y	Y	Y	Y		
European starling*	<i>Sturnus vulgaris</i>	Y	Y	Y	Y	Y	
Bell’s vireo	<i>Vireo bellii</i>		Y				
Plumbeous vireo	<i>V. plumbeus</i>		Y	Y			
Cassin’s vireo	<i>V. cassinii</i>		Y	Y			
Warbling vireo	<i>V. gilvus</i>	Y	Y	Y			
Warbling vireo	<i>V. gilvus</i>	Y	Y	Y			
Orange-crowned warbler	<i>Vermivora celata</i>					Y	
Nashville warbler	<i>V. ruficapilla</i>					Y	
Lucy’s warber	<i>V. luciae</i>	Y	Y	Y			
Yellow warbler	<i>Dendroica petechia</i>					Y	
Yellow-rumped warbler	<i>Dendroica coronata</i>		Y			Y	
Black-throated gray warbler	<i>D. nigriscens</i>					Y	
Townsend’s warbler	<i>D. townsendi</i>					Y	
MacGillivray’s warber	<i>Oporornis tolmiei</i>					Y	
Common yellowthroat	<i>Geothlypis trichas</i>					Y	Y
Wilson’s warbler	<i>Wilsonia pusilla</i>		Y			Y	
Yellow-breasted chat	<i>Icteria virens</i>						
Summer tanager	<i>Pirangra rubra</i>						
Western tanager	<i>P. ludoviciana</i>		Y				
Northern cardinal	<i>Cardinalis cardinalis</i>		Y	Y			
Pyrrhuloxia	<i>C. sinuatus</i>		Y				

Table 3: Mammal species that could occur in vegetative communities present in the Laveen ADMP focus area
A – Lower Colorado River B – Xeroriparian Washes C – Sonoran Upland Desertscrub D – Agriculture Areas E – Urban Areas F – Canals, Ponds, Lakes

Common Name	Scientific Name	A	B	C	D	E	F
Black-headed grosbeak	<i>Pheucticus melanocephalus</i>		Y				
Blue grosbeak	<i>Guiraca caerulea</i>		Y		Y		
Lazuli bunting	<i>Passerina amoena</i>		Y		Y	Y	
Green-tailed towhee	<i>Pipilo chlorurus</i>		Y			Y	
Canyon towhee	<i>P. fuscus</i>		Y	Y			
Abert's towhee	<i>P. aberti</i>		Y		Y	Y	
Chipping sparrow	<i>Spizella passerina</i>		Y	Y	Y	Y	
Brewer’s sparrow	<i>S. breweri</i>			Y	Y	Y	
Vesper sparrow	<i>Poocetes gramineus</i>	Y			Y		
Lark sparrow	<i>Chondestes grammacus</i>		Y	Y	Y		
Black-throated sparrow	<i>Amphospiza bilineata</i>		Y	Y			
Sage sparrow	<i>A. belli</i>	Y					
Lark bunting	<i>Calamospiza melanocorys</i>			Y	Y		
Savannah sparrow	<i>Passerculus sandwichensis</i>	Y		Y	Y		
Song sparrow*	<i>Melospiza meloda</i>				Y		Y
Lincoln’s sparrow					Y		Y
White-crowned sparrow	<i>Zonotrichia leucophrys</i>	Y	Y	Y	Y	Y	
Dark-eyed junco	<i>Junco hyemalis</i>	Y	Y	Y	Y	Y	
Red-winged blackbird	<i>Agelaius phoeniceus</i>				Y	Y	Y
Western meadowlark	<i>Sturnella neglecta</i>	Y		Y	Y		
Yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>				Y		Y
Brewer's blackbird	<i>Euphagus cyanocephalus</i>				Y		Y
Great-tailed grackle*	<i>Quiscalus mexicanus</i>				Y	Y	Y
Brown-headed cowbird*	<i>Molothrus ater</i>	Y	Y	Y	Y		
Hooded oriole	<i>Icterus cucullatus</i>		Y		Y		
House finch*	<i>Carpodacus mexicanus</i>	Y	Y	Y	Y	Y	
Lesser goldfinch	<i>Carduelis psaltria</i>		Y	Y		Y	
House sparrow*	<i>Passer domesticus</i>				Y	Y	
Couch spadefoot	<i>Scaphiopus couchi</i>	Y	Y				Y
Western spadefoot	<i>S. hammondi</i>	Y	Y				Y
Woodhouse toad	<i>Bufo woodhousei</i>		Y		Y	Y	Y
Red-spotted toad	<i>B. punctatus</i>			Y			Y
Great Plains toad	<i>B. cognatus</i>	Y	Y				Y
Sonoran Desert toad	<i>B. alvarius</i>				Y	Y	Y
Lowland leopard frog	<i>Rana yavapaiensis</i>				Y		Y
Bullfrog	<i>R. catesbiana</i>				Y		Y
Desert tortoise	<i>Gopherus agassizi</i>	Y	Y	Y			
Banded gecko	<i>Coleonyx variegatus</i>	Y	Y	Y			
Desert iguana	<i>Dipsosaurus dorsalis</i>	Y		Y			
Chuckwalla	<i>Sauromalus obesus</i>	Y		Y			
Zebratail lizard	<i>Callisaurus draconoides</i>	Y		Y			
Fringe-toed lizard	<i>Uma notata</i>	Y					
Collared lizard	<i>Crotophytus collaris</i>	Y	Y	Y			
Long-nosed leopard lizard	<i>C. wislizenii</i>	Y		Y			
Desert spiny lizard	<i>Sceloperus magister</i>	Y	Y	Y			

Common Name	Scientific Name	A	B	C	D	E	F
Clark’s spiny lizard	<i>S. clarki</i>						
Brush lizard	<i>Urosaurus graciosus</i>	Y					
Tree Lizard	<i>U. ornatus</i>		Y	Y			
Side-blotched lizard	<i>Uta stansburiana</i>	Y	Y	Y	Y	Y	
Desert horned lizard	<i>Phrynosoma platyrhinos</i>	Y	Y	Y			
Regal horned lizard	<i>P. solare</i>	Y		Y			
Western whiptail	<i>Cnemidophorus tigris</i>	Y	Y	Y			
Gila monster	<i>Heloderma suspectum</i>	Y	Y	Y			
Rosy boa	<i>Lichanura trivirgata</i>	Y	Y	Y			
Western blind snake	<i>Leptotyphlops humilis</i>	Y	Y	Y			
Spotted leaf-nosed snake	<i>Phyllorhynchus decurtatus</i>	Y	Y				
Saddled leaf-nosed snake	<i>P. browni</i>		Y	Y			
Coachwhip	<i>Masticophis flagellum</i>		Y	Y			
Sonoran whipsnake	<i>M. bilineatus</i>	Y	Y	Y			
Western patch-nosed snake	<i>Salvadora hexalepsis</i>	Y	Y	Y			
Glossy snake	<i>Arizona elegans</i>	Y	Y	Y			
Gopher snake	<i>Pituophis melanoleucus</i>		Y	Y	Y		
Common kingsnake	<i>Lampropeltis getulus</i>		Y	Y			
Long-nosed snake	<i>Rhinocheilus lecontei</i>	Y	Y	Y			
Checkered garter snake	<i>Thamnophis marcianus</i>				Y	Y	Y
Western ground snake	<i>Sonora semiannulata</i>	Y	Y	Y	Y		
Western shovel-nosed snake	<i>Chionactis occipitalis</i>	Y	Y	Y			
Banded sand snake	<i>Chilomeniscus cinctus</i>	Y	Y	Y			
Night snake	<i>Hypsiglena toquata</i>						
Arizona coral snake	<i>Micruroides euryxanthus</i>		Y	Y			
Western diamondback rattlesnake	<i>Crotalus atrox</i>	Y	Y	Y	Y		
Sidewinder	<i>C. cerastes</i>	Y	Y				
Tiger rattlesnake	<i>C. tigris</i>	Y	Y	Y			
Mohave rattlesnake	<i>C. scutulatus</i>	Y	Y	Y	Y		

Sources : Hoffmeister 1986, Jones et al. 1992

Aquatic Habitat

Aquatic habitat within the study area is limited to man-made features such as irrigation canals and lakes at the golf course located between 51st and 59th Avenues. Although these features occupy an extremely small portion of the total area of the site, they can provide habitat for a variety of species. These features provide an open water habitat that can be used by species that are incapable of utilizing other habitat in the study area.



Figure 2-46: Greater Egret

The alluvial plain between South Mountain and the Salt River is crisscrossed with ditches and canals used for agriculture irrigation. The four major irrigation features within the study area are: the Laveen Area Conveyance Channel, Dead Horse Ditch, Western Canal, and the Laveen Drain (see Figure 2-23). The Laveen Drain is a piped drain or pump ditch, but does provide conveyance for other irrigation features in the area.

Many bird species are dependent on open water for foraging or nesting habitat, and they would not be present in this vicinity without open water. These groups of birds include grebes, herons, ducks, rails, plovers, and sandpipers. The water features at the golf course likely provide the best open water habitat in the study area.

Although most mammals require some drinking water, large bodies of open water are usually not an essential part of their habitat requirements. During a field visit, otters were seen in the Maricopa and Dead Horse Drains.

Threatened and Endangered Species and Species of Concern

The USFWS list of federally protected species that have the potential to occur in Maricopa County was accessed. The AGFD was contacted in writing on September 27, 2000 to obtain species information from the Heritage Data Management System. The database tracks records for federally listed species and other species of concern throughout the State of Arizona. The records are indicative of those for which current or historic records exist within a 5-mile radius of a study area.

A field investigation was conducted October 18-20, 2000 to determine the habitat types present in the study area and its immediate vicinity. Dominant vegetation types and species were recorded during the evaluation. Based on documented habitat requirements, a determination was made of the suitability of the study area to support threatened and endangered species as having the potential to occur in Maricopa County. No species-specific surveys were conducted as part of this evaluation.

Appendix D provides a detailed description of the Threatened and Endangered and Species of Concern that may occur within the study area. No suitable areas that sustain threatened or endangered species were found. However, species-specific surveys may be required if the future proposed flood control structures will require removal of native Desertscrub habitat.

In addition, Sonoran desert tortoises may occur within the study area where native vegetation is present. If a desert tortoise is found in the study area during development, it is recommended that the AGFD’s Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects is followed. The guidelines are attached as part of Appendix E to this report.

Burrowing Owls occur within the study area and were observed along irrigation canals throughout the project area. Species-specific surveys and coordination with the FCDMC will be required prior to any construction activities to mitigate harm and/or harassment of Burrowing Owls within the project area.

Hazardous Materials Database Search

A Preliminary Initial Site Assessment (PISA) was performed to determine the potential for hazardous materials to be found in the study area. A hazardous materials records review was conducted within a 1-mile radius of the study area. A total of 236 federal and state environmental records, including hazardous materials incidents, were documented.

Records within the focus area were examined for relevance. For example, isolated minor incidents such as traffic accidents, and drug seizures were not considered further. A total of 15 federal and state environmental records, were documented within the focus area (see Figure 2-47). These records included: two Resource Conservation And Recovery Act (RCRA) compliance facilities, five registered Leaking Underground Storage Tanks (LUST), five registered Underground Storage Tanks (UST), and two dry wells.

Crop dusters were most popular during the late 1950s and early 1960s, and would have been used in this agricultural area. However, no landing fields for crop dusters were documented within the project area, as they did not need to be registered. Local knowledge of the area indicates specified landing field areas are unlikely, as fallow fields and roads would have been used (Wayne Comfort, All Lands, pers. comm. to HDR, 2000) .

The location of known RCRA, LUST, UST, and dry well locations will be considered during the alternative formulation analysis portion of this study. However, due to the limited number of environmental records within the focus area, it is unlikely they will impact the proposed project.

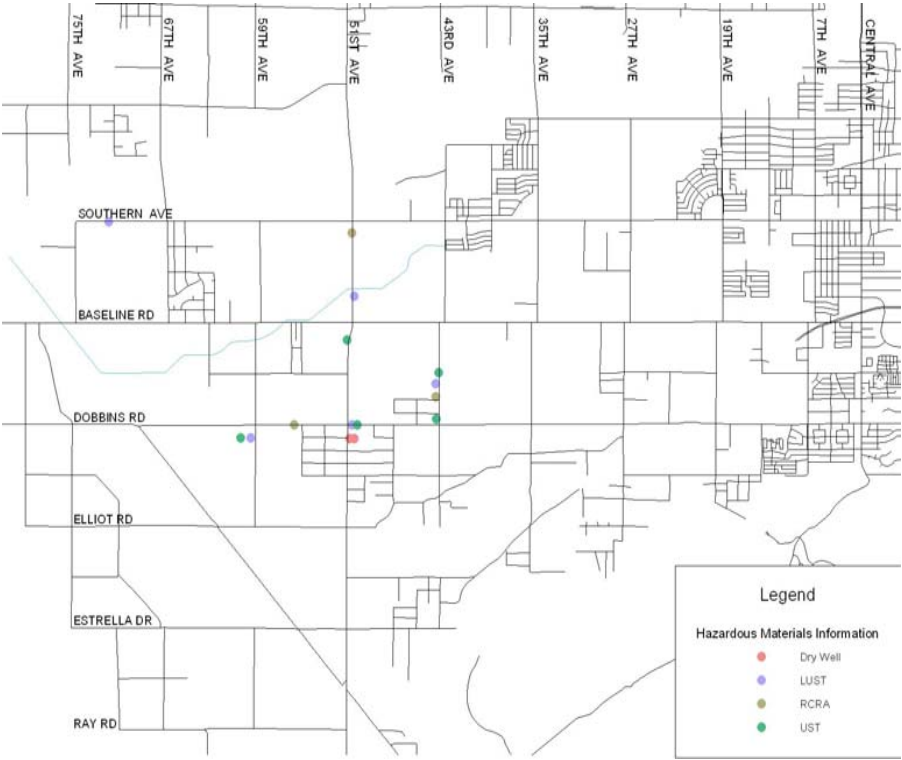


Figure 2-47: Federal And State Environmental Records Within Laveen ADMP Study Area

Environmental Overview Summary

Suitable habitat for the Cactus Ferruginous Pygmy-owl occurs within the study area, where native Sonoran Desertscrub occurs. Species-specific surveys for the Cactus Ferruginous Pygmy-owl may be required if project development activities require the removal of suitable Desertscrub habitat. No suitable habitat for other threatened and endangered species for Maricopa County exists within the study

area. Suitable habitat exists for the Sonoran desert tortoise and the Burrowing Owl. If a desert tortoise is found within the study area during project development, it is recommended that the AGFD’s Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects is followed. Species-specific surveys for the Burrowing Owl and coordination with the FCDMC will be required prior to any construction activities to mitigate harm and/or harassment of Burrowing Owls.

Due to the limited number of RCRA, LUST, UST, and dry wells within the study area, it is unlikely they will impact the proposed project.

CULTURAL RESOURCES

A diverse range of cultural resources, from prehistoric villages and canals to historic buildings and roads, are located within the Laveen Area Drainage Master Plan project area. Considerations as to how to mitigate potential impacts to these resources will play a major role in the planning process, especially in terms of scheduling, costs, and design parameters.

As a first step towards understanding the diversity and distribution of cultural resources in the project area, FCDMC contracted Scientific Archaeological Services (SAS) to conduct a Class I literature review of all previous work (Rodgers 2000). Archival records were checked at a variety of locations including the Arizona State Museum (ASM), State Historic Preservation Office (SHPO), Arizona State University Department of Anthropology, and Pueblo Grande Museum. The purpose of the literature search was two-fold: (1) to determine how much of the project area had been previously subjected to intensive cultural resources surveys, and (2) to identify the distribution and variability of all previously documented archaeological sites.

The SAS literature search found that 29 cultural resource-related studies have taken place within the project area (see Figure 2-48).

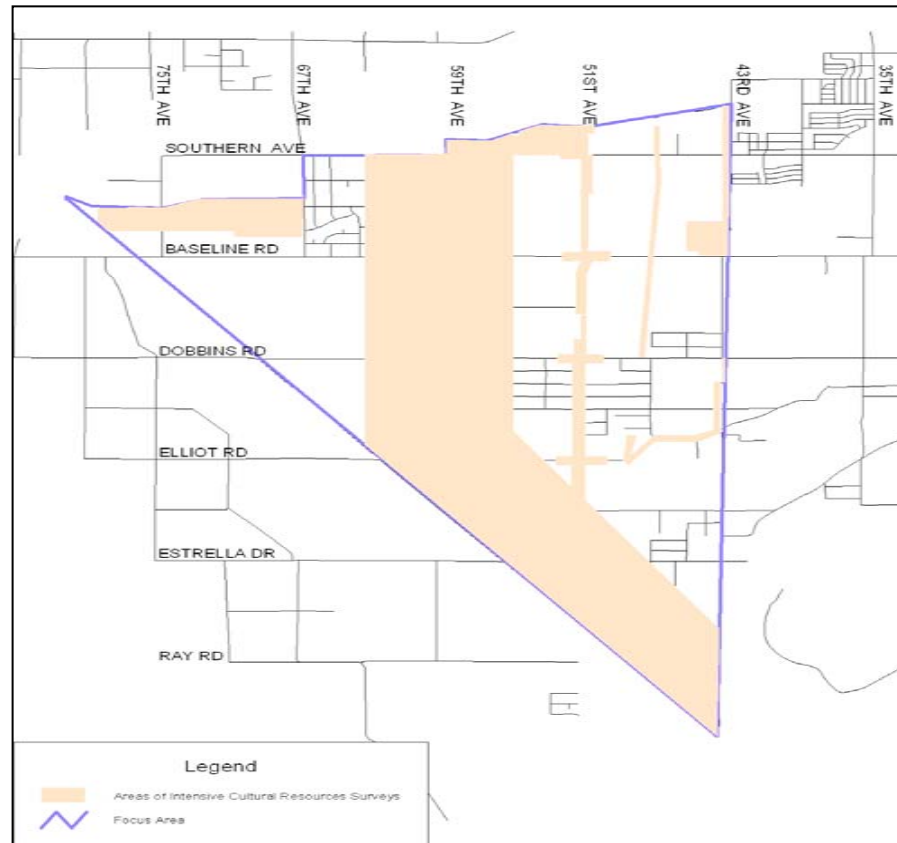


Figure 2-48: Areas previously surveyed within the Laveen ADMP area

Eleven of the studies were fairly recent intensive cultural resource surveys that covered a combined total of 2,710 acres, or approximately 23% of the project area. Forty-nine archaeological sites have been previously documented in the project area (14 prehistoric sites and 35 historic sites). The prehistoric sites include five large villages, five canals segments, three artifact scatters, and one small habitation site. Historic sites include seventeen designated and undesignated roads, six irrigation canals, five residential houses, two mining camps, two general stores, one schoolhouse, one post office, and one well.

It should be noted that although surface manifestations of many of these resources have been obliterated by the transformation of the landscape to agricultural fields, residential areas, and other uses, it is likely that intact cultural deposits and features are preserved subsurface. This is especially true for agricultural fields and roads where subsurface disturbances have been limited to only a few feet.

SAS has recommended that all State and Federal guidelines for managing the treatment and mitigation of cultural resources be included in the final plans for any flood control construction activities (Rodgers 2000). This will primarily entail following the provisions of the National Historic Preservation Act (NHPA), as amended. If the project ends up requiring Federal involvement, and therefore is considered a Federal undertaking, then stipulations of NHPA must be followed.

Cultural Resources Summary

Forty-nine archaeological sites have been previously documented in the project area (14 prehistoric sites and 35 historic sites). The prehistoric sites include five large villages, five canals segments, three artifact scatters, and one small habitation site. Historic sites include seventeen designated and undesignated roads, six irrigation canals, five residential houses, two mining camps, two general stores, one schoolhouse, one post office, and one well.

It is recommended that Class III pedestrian surveys be conducted for all areas of planned development, not previously assessed. Sites determined to be eligible or potentially eligible for the National Register of historic Places (NRHP), or NRHP-listed properties, should be avoided. If avoidance is not possible, then any potential impacts will likely have to be mitigated through archaeological testing and/or data recovery excavations.

GEOTECHNICAL CONSIDERATIONS

Information regarding topography, geology, groundwater, and surface and near-surface soil and rock conditions is presented in this section. The information presented herein is based on research activities only. Figure 2-49 illustrates extent of soil types within the study area as well as groundwater information.

Site Characterization

The study area is in a primarily agricultural area southwest of the Phoenix metropolitan area. Other land uses include residential, commercial, industrial, and native desert. At a distance from South Mountain Park, which is where most improvement alternatives are likely to be required, the area is relatively flat. There is a mild downward gradient to the northwest in the valley floor on the order of about 16 feet per mile. Bedrock, related to the South Mountains, is suspected to dip moderately to the north (away from the mountains) and underlie surficial soils comprised of Tertiary (old) and Quaternary (recent) alluvial materials.

Geotechnical factors that may affect the selection process include groundwater and soil conditions. Preliminary index and engineering properties for each mapped soil series that may be used for preliminary evaluation of alternatives are presented in Table 4. Additional geotechnical analysis is recommended when alternatives are preliminarily defined and being evaluated.

Groundwater

Well data in the study area from the 1990s indicates that groundwater will only affect relatively deep improvements because, in most of the study area, groundwater was 30 to 90 feet below the surface.

However, shallower depths were recorded in the northern portion of the site nearer the Salt River Channel. Accordingly, groundwater should be considered a factor in areas of reported shallow groundwater and where relatively deep improvement alternatives are being considered.

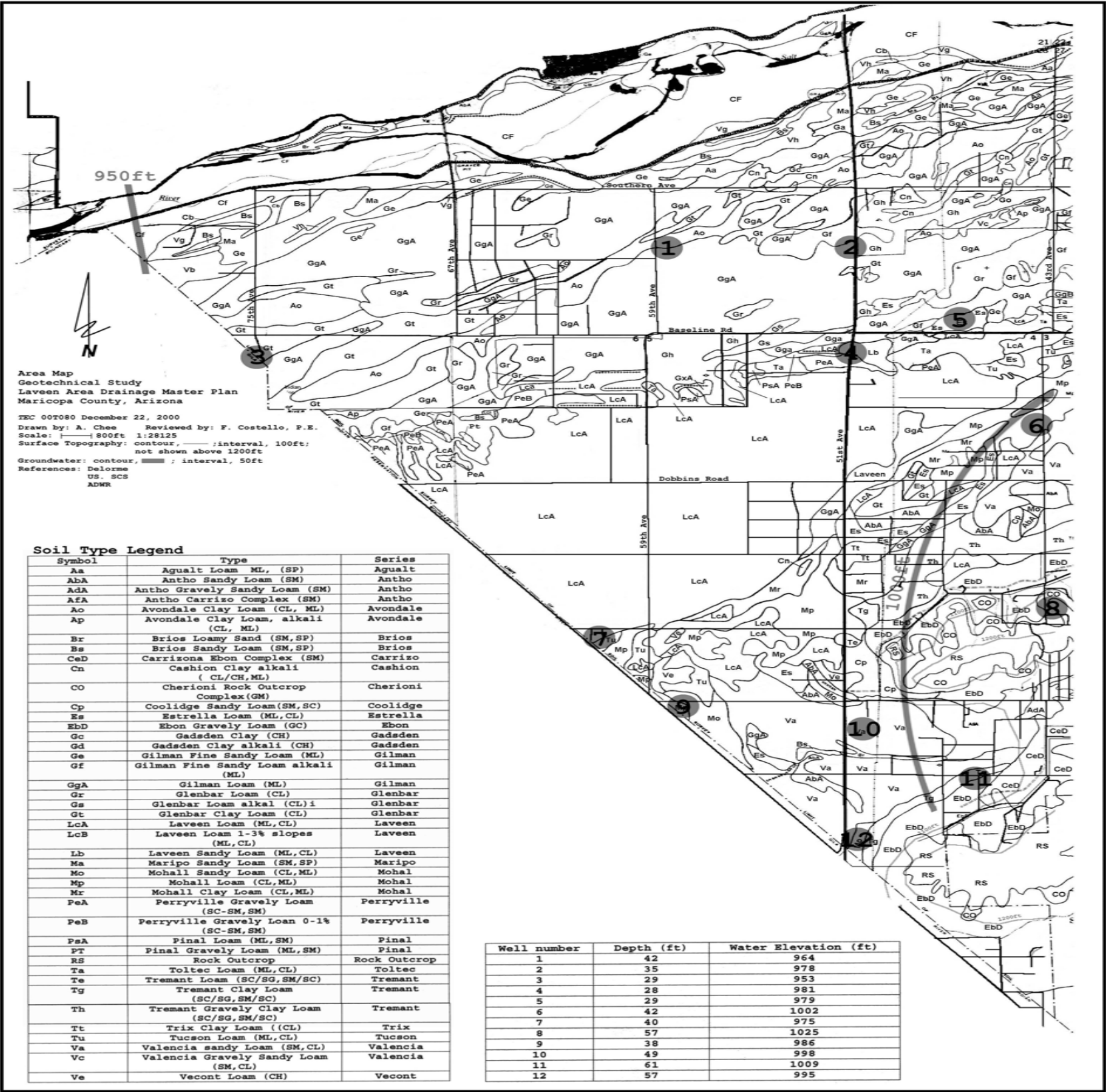


Figure 2-49: Soil types within Laveen ADMP focus area

Table 4: Summary of Key Soil Condition Elements

SCS Soil Series	USCS Soil Class	Permeability ⁽¹⁾		Risk of Corrivity to-		Compacted Shear Strength ⁽⁴⁾	Erodibility	
		Natural Condition	Compacted Condition	Steel ⁽²⁾	Concrete ⁽³⁾		Natural Condition ⁽⁵⁾	Compacted ⁽⁶⁾ Condition
Agualt	ML SP	moderate very rapid	high	high	low	medium	slight	
Antho	SM	moderate rapid	medium	high	low	medium	slight to moderate	piping
Avondale	CL ML	moderate slow moderate	medium	high	low to high	medium	slight	piping
Brios	SM SP	rapid	medium	moderate	low to moderate	medium	slight	piping
Carrizo	SM SW-SM	rapid	high	low	low	high	slight	
Cashion	CL/CH ML	slow	low	high	low to moderate	medium	slight	piping
Cherioni- Rock	GM	moderate very slow		high	low		slight to moderate	
Coolidge	SM SC	moderate rapid	medium	high	low	medium	slight to moderate	piping
Ebon	GC	slow	low	high	low	medium	slight to moderate	
Estrella	ML CL	moderate slow	medium	high	low	low	slight	piping
Gadsden	CH	slow	low	high	moderate	low	slight	
Gilman	ML	moderate	medium	high	low to high	low	slight to moderate	piping
Glenbar	CL	moderate slow	medium	high	low to moderate	low	slight	piping
Laveen	ML CL	moderate	medium	high	low to moderate	low	slight to moderate	piping
Maripo	SM SP	moderate	medium	high	low	low	slight	piping
Mohall	CL ML	moderate slow	medium	high	low	low	slight	piping
Perryville	SC-SM SM	moderate	medium	high	low	medium	slight to moderate	
Pinal	ML SM	moderate		high	low		slight to moderate	
Rock Outcrop								
Toltec	ML CL	moderate slow	medium	high	moderate	low	slight	piping
Tremant	SC/GC SM/SC	moderate slow	medium	high	low	medium	slight to moderate	
Trix	CL	moderate slow	medium	high	low	medium	slight	
Tucson	ML CL	moderate slow	medium	high	low	medium	slight	
Valencia	SM CL	moderate rapid moderate slow	low	high	moderate	medium	slight	
Vecont	CH	slow	low	high	moderate	low	slight	piping

(1) Refers to the ability of the soil in a natural or compacted condition to transmit water or air. Reported values do not account for lateral seepage.

(2) Rate of corrosion on uncoated steel is related to soil properties such as drainage, texture, total acidity, and electrical resistivity.

(3) Rate of corrosion on concrete is influenced mainly by sodium and magnesium sulfate content, but also by soil texture and acidity.

(4) Refers generally to the shear stress in a soil mass as a factor in determining ultimate bearing capacity, stability of embankments, pressure against retaining walls, etc

(5) Refers to the relative slope of a graded field or channel bottom at which erosion may occur.

(6) Refers to the ability of the soil to resist erosion in an embankment condition such as a dike or levee.

Soil Conditions

Soils formed in recent and old alluvium are predominant in the study area. A tremendous amount of information from the SCS soil survey of Maricopa County was presented in Soil Conditions, and key elements from that Section are summarized in Table 4 for easier cursory evaluation of improvement alternatives. Elements included in the table are: SCS soils series, Unified Soils Classification System soil classification, natural and compacted permeability, risk of corrosion for uncoated steel and concrete, compacted shear strength, and natural erosion hazard and susceptibility of compacted soil to piping. Because of its limitations, information from the SCS survey should only be used for general evaluation of shallow improvement alternatives.

Mapped soils in the study area vary from fat clays (CH) to silty gravels with sand (GM). With respect to natural and compacted permeability, reported characteristics agree with geotechnical theory; granular and non-plastic soils have moderate to high permeabilities, and fine-grained and plastic soils have moderate to low permeabilities. Agreement with geotechnical theory was also reported with respect to compacted shear strength and susceptibility to piping; granular and well-graded soils have higher shear strengths than fine-grained and poorly graded soils, and fine-grained soils are commonly susceptible to piping. Natural erosion risk was slight for most soils, but increased to moderate for some soils because of slope. The risk of corrosion was high for uncoated steel for almost all soils and low for concrete for most soils. However, variations from this pattern were reported, and corrosivity should be evaluated for alternatives this characteristic may affect. Calcareous soils, cobbly soils, hardpan, and shallow bedrock were also reported in some soil series and should be considered during the evaluation process, especially with regard to excavatability.

Geotechnical Summary

A review of topographic, geologic, groundwater, and surface and near-surface soil and rock properties was performed on the basis of literature and field research. No field sampling or laboratory testing was performed for this review.

Depth to groundwater may be a limiting factor in very deep excavations for large diameter storm drains, or for very deep basins or channels, particularly those close to the Salt River. Uncoated steel

in contact with the soil will have a reduced life and should be protected. The use of concrete pipe and concrete structures is preferred, with adequate depth of cover over reinforcing steel. Engineered fill slopes will be subject to erosion and should not be left unprotected.

Prior to design of any specific improvements, a field investigation and report should be prepared to determine specific soil properties.

SOCIOECONOMIC CONSIDERATIONS

The information contained in this section was obtained from interviews with staff members representing City of Phoenix, Maricopa County, Gila River Indian Community, Maricopa Association of Governments (MAG) and FCDMC.

Regional And Local Context

Laveen is a district roughly bounded by 19th Avenue, the Salt River, South Mountain Park and the Gila River Indian Reservation. The study area roughly follows the boundaries of the Watershed and steps over to the 7th Street alignment at the ridge line of South Mountain south of Central Avenue. The City of Phoenix and Maricopa County have jurisdiction within the Laveen area. Because the area is bounded on three sides by the City of Phoenix, and because as development occurs annexation into the City is preferable, the County respects the City of Phoenix plans in Laveen.

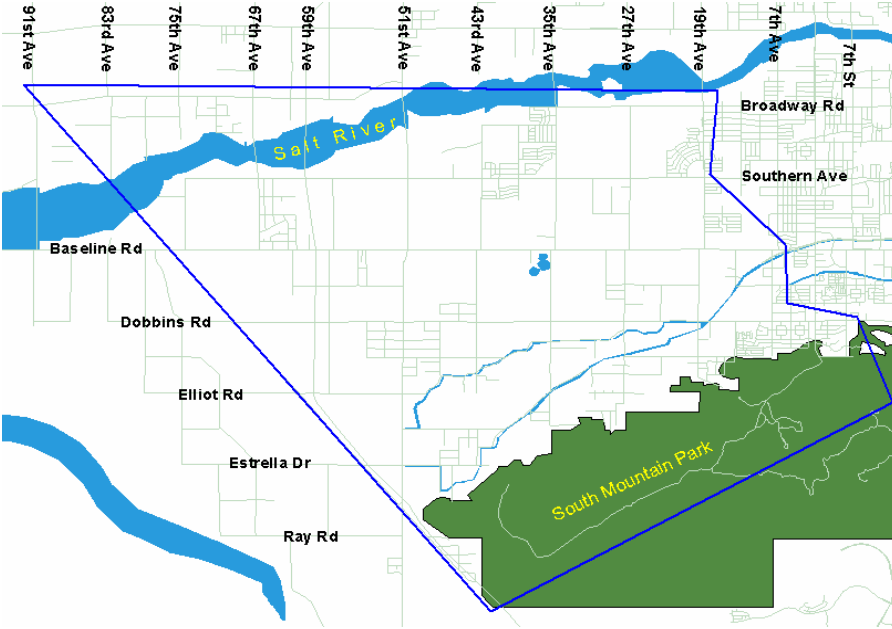


Figure 2-50: Laveen ADMP study area

Existing Social And Economic Environment

Despite it’s proximity to downtown Phoenix, the study area has remained somewhat isolated from the rest of the Valley. Separated by the Salt River to the north, the Gila Indian Community to the west and South Mountain to the south, and the low income areas of South Phoenix to the east, the area has retained much of its rural character and population through today. Consequently, the average study area resident has a lower median family income and is more likely to be Hispanic or another minority than Maricopa County or Phoenix residents. Slightly more than half the population is between 20 and 55 years old.

Census Tracts:

Eleven census tracts are included in the study area. Census estimates were developed using all of the information from tract 116601, and weighted information from other tracts, based on the amount of land area included in each tract. Although the City of Phoenix and Maricopa County participated in the 2000 census, data from this effort is not yet available.

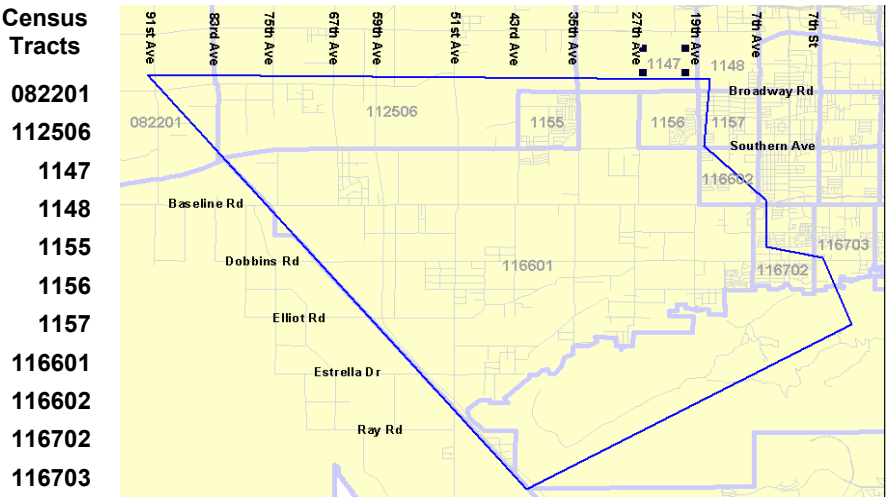


Figure 2-51: Census Tracts

Source: U.S. Census, 1990 Census Tracts

Income

The average median family income in the study area is \$22,031 or 66% of the Maricopa County average of \$33,474. Because the study area includes a portion of South Phoenix outside Laveen (from 19th Avenue East of Southern Avenue), the study area median family income is also lower than that of Laveen and Phoenix residents.

Laveen residents reported a 1989 average household income of \$32,880; Phoenix residents reported an income of \$39,159 in 1989. Substantial new development has occurred in the area since 1989, and is ongoing, and current incomes are likely to more closely resemble those of the greater Phoenix area.

Ethnicity

The study area is more ethnically diverse than the overall Maricopa population (see chart). Using 1990 Census data, over three-quarters of the study area population identifies themselves as Hispanic or other, as compared with the City of Phoenix which is 53% Hispanic or other minority. The study area ethnicity does not substantially differ from that of the Laveen area.

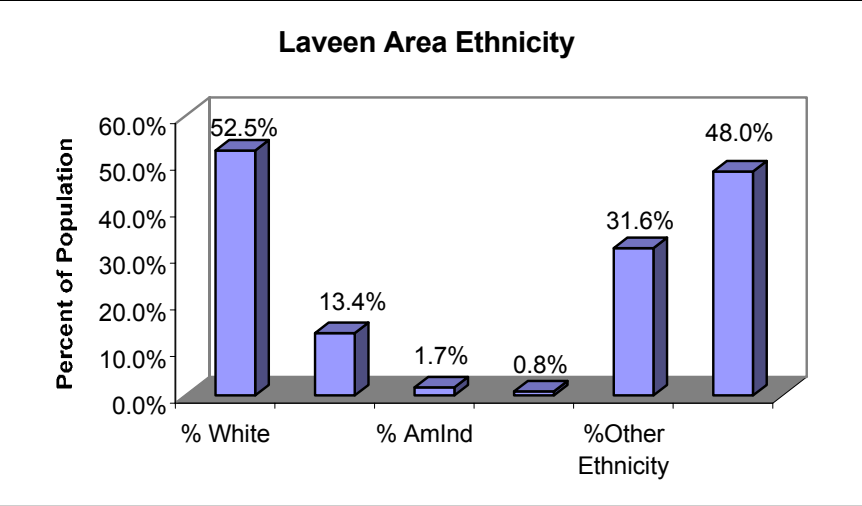


Figure 2-52: Ethnical Diversity for Laveen ADMP study area

Age Distribution

Over half the study area population is between 20 and 54 years old. The study area population has a significantly larger youth (ages five to 17 years old) population and a slightly smaller middle aged (25-44) population than the City of Phoenix as a whole. There are also significantly less older (65-84 years of age) residents in the study area than the City of Phoenix. The study area population is similar to that of the Laveen area.

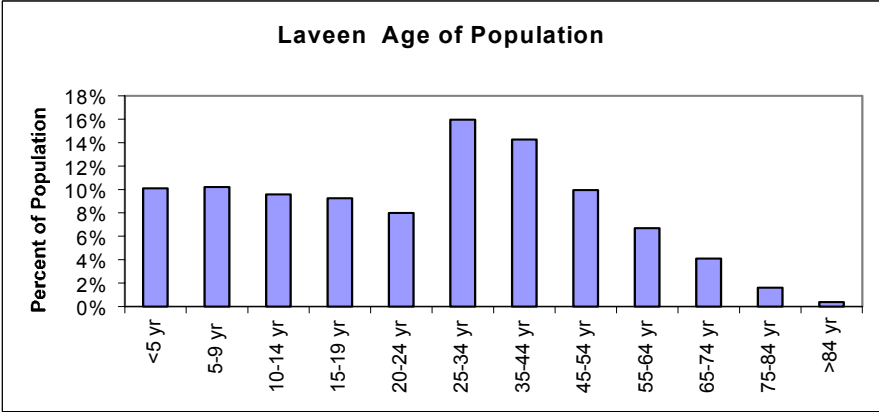


Figure 2-53: Age Distribution for Laveen ADMP study area

Population Trends

Over the next 20 years, the population in the study area is projected to quadruple. Most of the population growth is anticipated to occur west of 27th Avenue as a result of the construction of the Southwest Loop along 61st Avenue. The largest increases in persons is projected to occur after 2010.

Table 5: Study Area Population Projections 1995 - 2020

Year	1995	2000	2005	2010	2015	2020
Population	18,495	21,028	29,816	37,823	59,290	83,741
Percent Change		13.7%	41.8%	26.9%	56.8%	41.2%

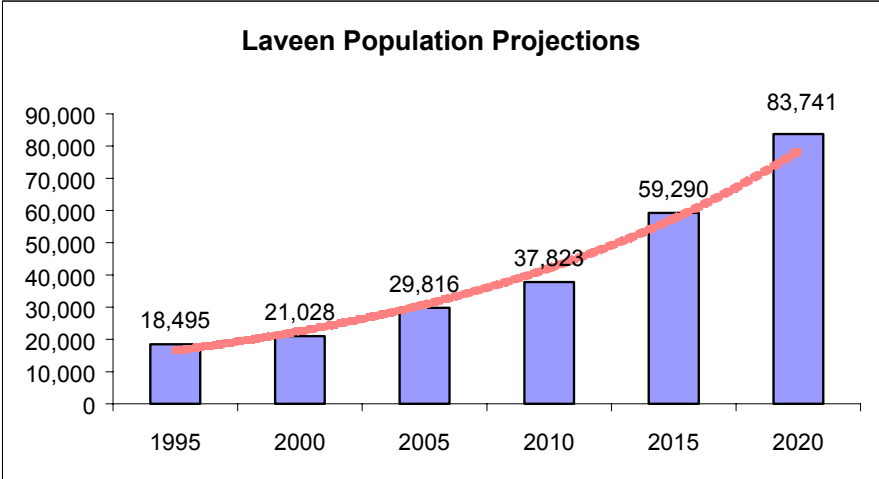
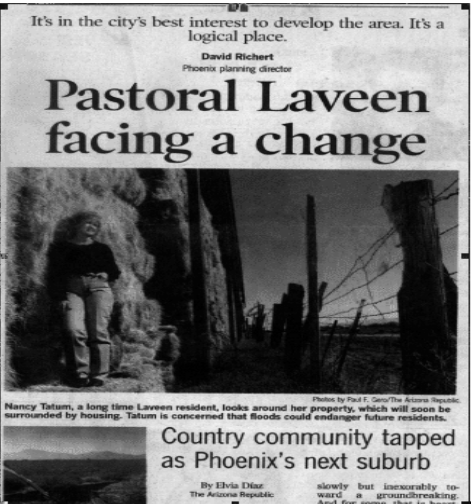


Figure 2-54: Laveen ADMP study area population projections for 1995-2020
Source: MAG Socio-Economic Projects (1997)

Housing

Housing growth is commensurate with population growth, with the number of units quadrupling over the next two decades and the largest increases in housing growth occurring after 2010.



Source: The Arizona Republic

Table 6: Laveen Area Housing Unit Projections 1995 - 2020

Year	Housing Units	Percent Change
1995	5,663	
2000	6,453	14.0%
2005	9,462	46.6%
2010	12,234	29.3%
2015	19,710	61.1%
2020		43.6%

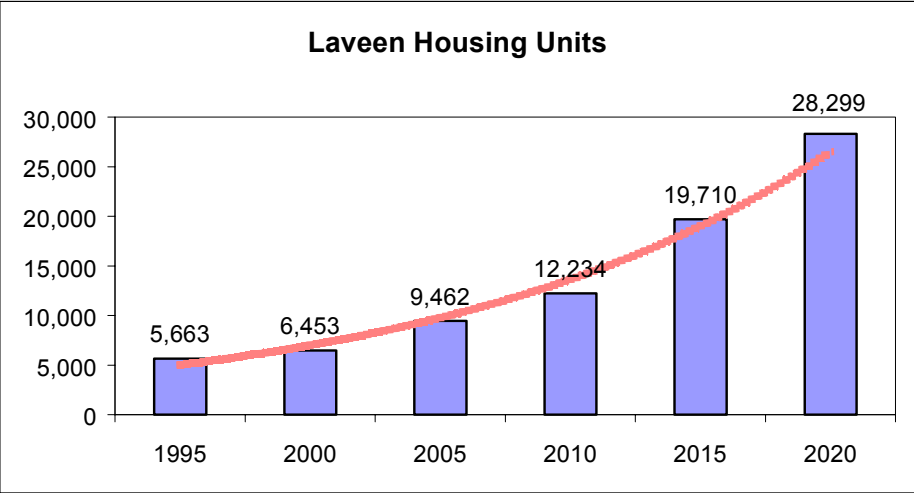


Figure 2-55: Laveen ADMP study area housing projections 1995-2020
Source: MAG Socio-Economic Projects (1997)

Employment projections

The study area will continue to be an exporter of jobs. The 2020 job to population ratio is projected to be 0.1 as compared to the current job to population ratio of 0.78. This is probably a result of the anticipated change from a rural to a more suburban environment. The job to population ratio in study area is substantially lower than Maricopa County and Phoenix.

Table 7: Laveen Area Employment Projections 1995 - 2020

Year	1995	2000	2005	2010	2015	2020
Employment	4,010	5,065	6,320	7,454	8,425	9,136
Percent Change		26.3%	24.8%	17.9%	13.0%	8.4%

Socio-Economic Summary

The Laveen area’s isolation from Phoenix is reflected in the resident’s socio-economic data. According to 1990 Census information, average incomes represent only 66% of the median Maricopa County family income, the population is younger than that of the greater Phoenix area, and over three-quarters of Laveen residents are Hispanic or other minority.

The most dramatic change facing Laveen in the next twenty years will undoubtedly be growth; the population in the area is expected to quadruple by the year 2020 to 83,741. Housing units in the area will see an even larger increase with a total of 28,299 units expected by the year 2020 (Maricopa Association of Governments Socio-economic Projections, 1997.)

OPPORTUNITIES AND CONSTRAINTS

Many opportunities and constraints have been identified during the course of performing the Existing Conditions Analysis phase of the ADMP. These include opportunities and constraints related to partnering with specific stakeholder interests, multi-use opportunities for joint facilities, and addressing community-based concerns.

During the Alternatives Formulation Phases, and other subsequent phases of the ADMP, several issues will be critical to incorporating the opportunities and constraints into the implementation of ADMP. These issues are summarized below:

- The ADMP process provides the opportunity to work with land developers and concerned citizens as a stakeholder group to provide community-based solutions to potential flooding problems in advance of future development. This is a significant shift from reactive flood control measures, which attempt to solve flooding problems after development has occurred.

A constraint to the process may be identifying alternatives that address possible conflicting goals of developers and concerned citizens. As in most urbanizing areas, pro-development and anti-development forces have valid concerns to about the nature and character of any infrastructure improvements.

- The Laveen Area Conveyance Channel being advanced by the FCDMC will be the primary outfall for the Laveen area and gives the opportunity to combine within that right-of-way multiple-use recreation and open space with active and passive flood control features.

As the primary outfall, it establishes the major drainage pattern of the watershed and therefore constrains to some extent the location of other drainage infrastructure elements. The alignment of the channel may be difficult to combine with potential ties to trails that would interlink the area to areas such as South Mountain Park.

- The Gila River Indian Community constitutes a political boundary on the downstream side of the study area. Two of the three major watersheds in the study area currently outfall across the Reservation. The opportunity exists to work with the Gila River Indian Community to help mitigate flows in the study area without negatively impacting downstream properties.

Constraints do exist in acquiring Right-of-Way across allotted lands on the Reservation, and on addressing other issues such as public access for multi-use facilities. Working within these constraints is not without precedent, however, and should not be viewed as constituting a solid barrier between off-reservation and on-reservation flood control solutions.

- ADOT has proposed a corridor for the future South Mountain Transportation corridor that currently is projected to parallel a portion of the downstream side of the study area, and continue north near the alignment of 63rd Avenue. The transportation corridor would be elevated on embankment. The drainage system for the transportation corridor would include a drainage channel on the upstream side of the transportation corridor that would intercept offsite flows. Although timing may be critical, an opportunity exists to advance the planning of the ADOT drainage system and include it as an element of the Laveen ADMP. This could bring about a possible cost sharing agreement.

Because planning for the transportation corridor is at such an early stage, there would be some risk involved in sizing and locating a flood control facility that would serve a multi-use purpose of protecting the transportation corridor. Due to the safety concerns associated with an urban transportation corridor, there may be limitations on multi-use opportunities in this corridor if combined with ADOT.

- COP and MCDOT have planned improvement projects along 51st Avenue from Baseline Road to Elliot Road. Similar past projects have included funding contributed by FCDMC for the inclusion of storm drains that would serve as flood control and transportation corridor drainage conveyance. The opportunity exists for project coordination with the COP, MCDOT, and FCDMC in these projects. Significant flows could be collected and conveyed to the north in this option that can outfall to the Laveen Area Conveyance Channel.

Several improvement projects are due to go to construction very soon and time constraints will become critical very quickly.

- SRP irrigation delivery ditches and irrigation drain ditches are prevalent throughout the study area. During storm events, these facilities impede flows as well as receive drainage. Current SRP practice is to open all gates to allow these to drain and not impede storm flows. The opportunity exists of tying these facilities to any planned storm drains or channels to allow conveyance of storm flows. In the areas where no aggressive development plan exists such as Carver Mountains and South Mountain, this option is more feasible since the existing ditches will not likely be converted to piped drains.

There may be potential permitting and operational constraints associated with directly connecting SRP laterals and ditches to municipal storm drain facilities.

- The Southwest Area Growth Study/Laveen has recommended locations for desired trailheads at South Mountain Park and for river access trailheads along the Salt River. The opportunity exists to place drainage collection points in the locations of the desired trailheads for connection to South Mountain Park are for 27th Avenue, 35th Avenue, and Estrella Drive, and to place drainage outfall locations along the Salt River in the recommended locations for river access trailheads, also as specified in the Southwest Area Growth Study/Laveen, which are 27th Avenue, 43rd Avenue, and 71st Avenue.

The constraint surrounding these specific locations is that they may not be hydraulically efficient. For example, a trailhead located for access to South Mountain Park may be too high in the watershed to serve as an effective detention basin.

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